University Of Alberta
0 0000 43553 19

INVESTIGATING SCHOOL MATHEMATICS

Canada metric Canada métrique

INVESTIGATION DISCUSSION UTILIZATION

Accompanying
AV material
at
QA 36.5
E3415 1969
CURR AV

CURRICULUM

Ex libris
Universitatis
Albertaensis

QUAECUMQUE VERA

Investigating School Mathematics

ROBERT E. EICHOLZ

PHARES G. O'DAFFER

CHARLES R. FLEENOR

Collaborators for Reference Material and Metrication

JOHN BATES, *Principal, Blake Street School, Toronto*

DONALD IRWIN, *Principal, Roden Public School, Toronto*

J. NORMAN C. SHARP, *Co-ordinator of Mathematics, Etobicoke*

JAMES SHERRILL, *Professor, Faculty of Education, University of British Columbia, Vancouver*

GARRY HAMILTON, *Staff artist, Montreal Star*

ADDISON-WESLEY (CANADA) LTD.

DON MILLS, ONTARIO • READING, MASSACHUSETTS • MENLO PARK, CALIFORNIA • LONDON

Contents

Copyright © 1973 by Addison-Wesley (Canada) Ltd.
All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.
PRINTED IN CANADA. This edition is not authorized for sale or distribution in the United States.
CDEFGHIJKL 79876
ISBN 0-201-01124-7

LIBRARY
UNIVERSITY OF ALBERTA

Illustrations by Sue Gilmour, Reid Fancher, and Patti Dwyer. Photographs by Marshall Berman.
Cover design by Dennis Mason, Toronto.

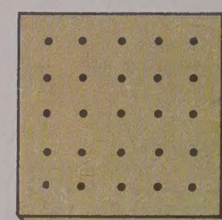
2594053

Investigating the Ideas

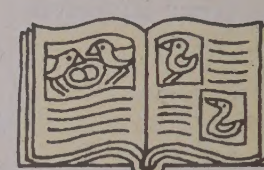
This is a sample lesson. It will help you understand how to use your book. In this part of a lesson there are things for you to **investigate** and discover.

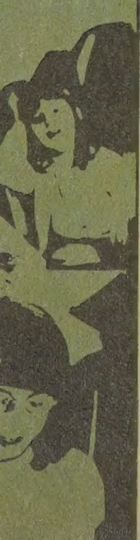
1. Can you find an "Investigating the Ideas" section where you use colored strips like these?

2. Can you find an "Investigating the Ideas" section where you use dot paper or a board with nails in it?



3. Can you find an "Investigating the Ideas" section where you look in the newspaper, a magazine, or another book?





Discussing the Ideas

In this part of a lesson you will **discuss the ideas** you investigated. You will be sharing your ideas with others. You will be getting ready to **use the ideas.**

1. A Which of the "Investigating the Ideas" sections you looked at seemed interesting? Why?
   B Does a "Discussing the Ideas" section follow that "Investigating the Ideas" section? Does it ask you to explain something or to give your ideas? Read one of the questions.

2. Does every "Discussing the Ideas" section follow an "Investigating the Ideas" section?

In this part of the lesson you will **use the ideas.** You will work problems to improve your understanding of the ideas you have discussed. Try these.

1. How many "Investigating the Ideas" sections are in Chapter 4?

2. Find the number of "Discussing the Ideas" sections in Chapter 6.

3. How many "Using the Ideas" sections are in Chapter 8?

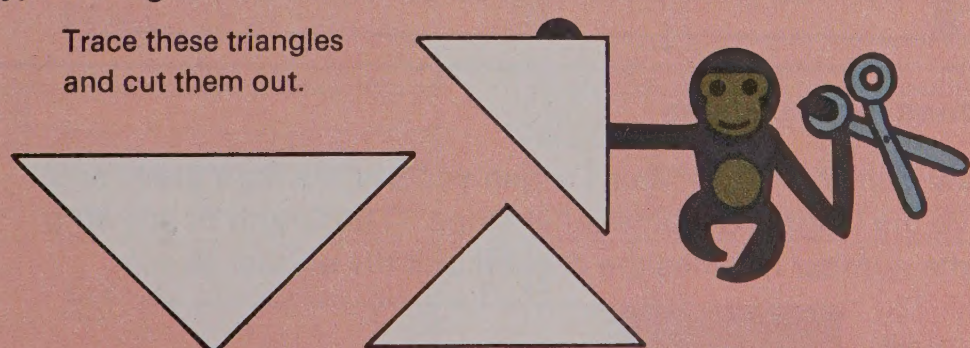
4. A Give the page number for a lesson called "Keeping in Touch."
   B Find the **Activity Card** for this lesson. What page number is it on?

5. Look up *segment* in your **index.** What page numbers are given?

Problems in these boxes are a **special challenge** for you. Be sure to try some of them. See if you can do this one.

think

Trace these triangles and cut them out.



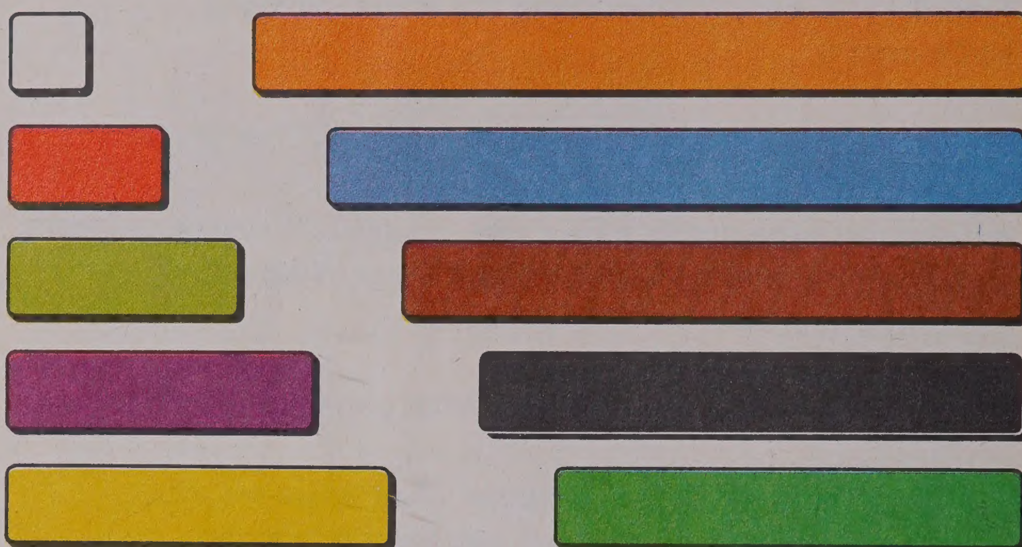
Can you fit them together to form a square? a rectangle?

1 Numbers and Measurement

How do we use numbers in measurement?

Investigating the Ideas

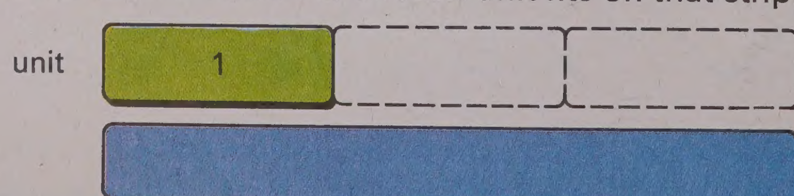
Think of the number 1 when you see the white strip. What numbers do you think of when you see each of the other strips?

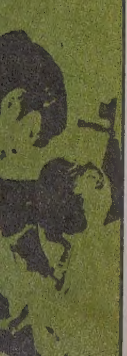


? Think of the number 1 when you see the red strip. Can you give numbers for some of the other strips?

Discussing the Ideas

Now think of the number 1 when you see the light green strip. Give the lengths of some other strips. (The length of any strip is the number of times the chosen unit fits on that strip.)





Give the missing number in each exercise below.
You may want to use your strips to find the answers.

1. IF this is one unit long
1
THEN the length of this strip is
?

2. IF this is one unit long
1
THEN the length of this strip is
?

3. IF this is
1
THEN this is
?

4. IF this is
1
THEN this is
?

5. IF
1
THEN
?

6. IF
1
THEN
?

7. IF
1
THEN
?

8. IF
1
THEN
?

9. ★ IF
10
THEN
?

10. ★ IF
10
THEN
?

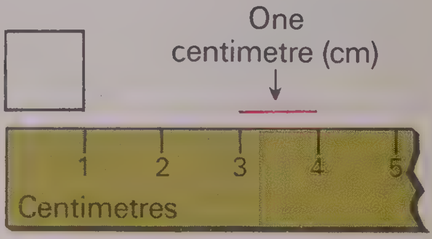
Investigating the Ideas

If the white strip  is one **unit** long, what is the length of the top of your desk?

? Can you find an easy way to find this length?

Discussing the Ideas

1. What easy way did you find to measure your desk?

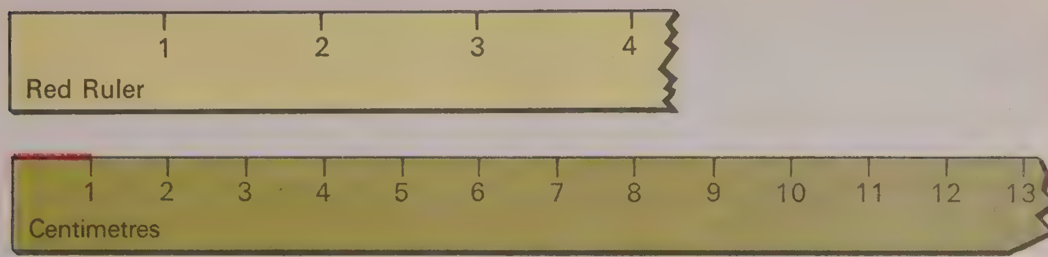


2. A What does the picture show?

   B How could you find the length of the top of your desk with a centimetre ruler?

3. To find length, we may choose any unit, but it is easier if we use special units, like the **centimetre.** Do you think the length of the top of your desk found using red strips is more or less than the length found using the centimetre ruler? Check your answer.

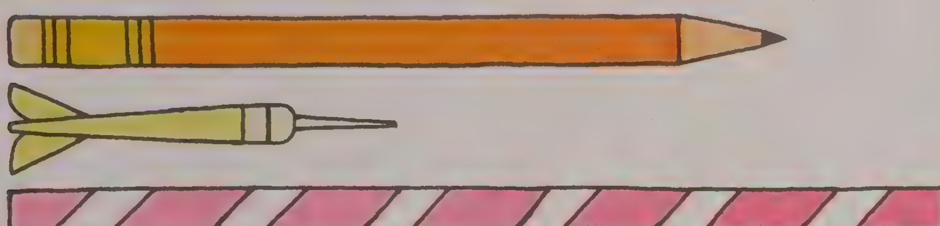
1.



A Which is longer, a red strip or a centimetre ?
B Give the length, in centimetres, of each of your strips.
C Which strip is about 4 centimetres long ? 4 red strips long ?

2. Use your centimetre ruler to measure these objects.

A
B
C



3. Use your centimetre ruler to measure these objects.

A

B

4. Draw pictures of objects that are this tall.
A 12 cm B 20 cm

5. A boy is 6 times as tall as this page. Will you get a number greater or less than 150 when you measure him with a centimetre ruler ?

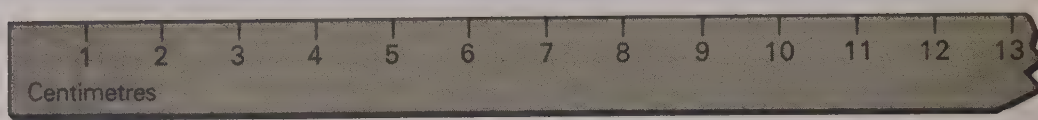
think

How many paper clips would you guess it would take to reach across your classroom ? Make a ruler, using a paper clip as the unit, and check your guess.

Investigating the Ideas

How good are you at **guessing** lengths of objects ?
Try this Investigation with a classmate.

1 Use centimetre units.



Write your guesses for:

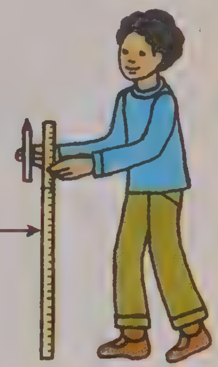
- the length of your desk top
- the height of a window
- the length of your shoe
- the length of the teacher's desk
- the width of a closet door

? Can you check your guesses by measuring ?

Discussing the Ideas

1. Which of your guesses is closest to the length of the object you measured ?
2. Do you have any special ways to make good guesses of objects' lengths ?
3. Guess the height of a classmate, using the centimetre as the unit. Check your guess.
4. Guess your own height in centimetres. Then check your guess.

Comparing Metric Units	
1 centimetre ——	1 cm
A decimetre is 10 centimetres long.	1 dm = 10 cm
A metre is 10 decimetres long.	1 m = 10 dm
A kilometre is 1000 metres long.	1 km = 1000 m

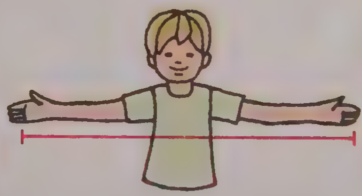


1. Give the word [centimetre(s), metre(s), kilometre(s)] that best completes each sentence.
   - A A pencil is about 15 __?__ long.
   - B A man is about 200 __?__ tall.
   - C A basketball hoop is 3 __?__ high.
   - D A jet plane might fly 7 __?__ high.
   - E A football field is 96 __?__ long.
   - F A book is about 20 __?__ wide.
   - G A man might be about 2 __?__ tall.
   - H You could walk a distance of one __?__ in about 15 minutes.
   - I A basketball court is about 27 __?__ long.
   - J Your hand is about 7 __?__ wide.
   - K A postage stamp is about 2 __?__ high.
   - L Niagara Falls is about 50 __?__ high.

2. First estimate and then find (to the nearest centimetre) the distances on your body suggested by these pictures.

A 

B 

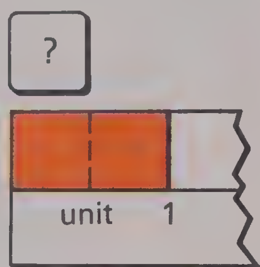
C 

D 

Investigating the Ideas

A

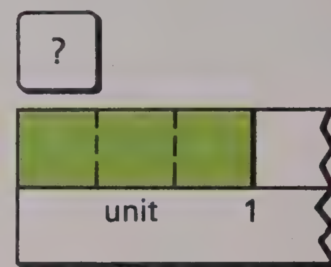
If the red strip
is the unit,
what is the length
of the white strip ?



The answer to question **A**
is the **fractional number** $\frac{1}{2}$
(**"one half"**).

B

If the light green strip
is the unit,
what is the length
of the white strip ?

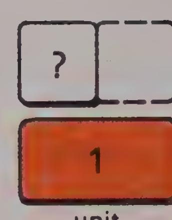


The answer to question **B**
is the **fractional number** $\frac{1}{3}$
(**"one third"**).

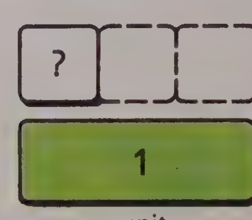
? Can you give the length of the white strip
when each of the other strips is the unit ?

Discussing the Ideas

1. In **A** the white strip is 1 of 2 parts needed to match the unit. How are these numbers used to write the fractional number for the length of the white strip ?



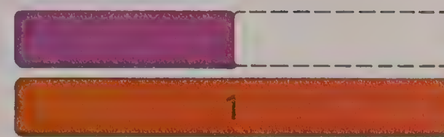
2. In **B** the white strip is 1 of 3 parts needed to match the unit. How are these numbers used to write the fractional number for the length of the white strip ?



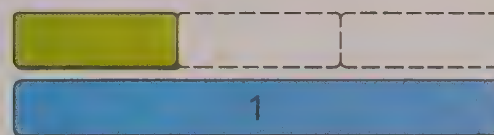
3. Explain what you found in the Investigation.

1. The unit strip has a "1" on it in each exercise. Give the missing numbers.

   A The purple strip is __?__ of __?__ parts needed to match the unit. Its length is __?__.



   B The light green strip is __?__ of __?__ parts needed to match the unit. Its length is __?__.



   C The red strip is __?__ of __?__ parts needed to match the unit. Its length is __?__.

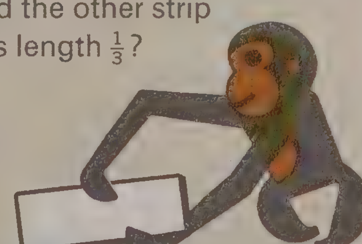
   D The white strip is __?__ of __?__ parts needed to match the unit. Its length is __?__.

2. If the dark green strip is the unit, what is the length of the
   A white strip?
   B red strip?
   C light green strip?
   ★ D yellow strip?

3. If the orange strip is the unit, what is the length of the
   A yellow strip?
   B red strip?
   C orange strip?
   ★ D light green strip?

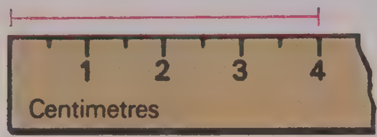
think

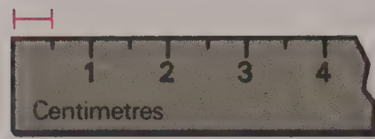
Can you find 3 strips so that when one strip is the unit, another strip has length $\frac{1}{2}$, and the other strip has length $\frac{1}{3}$?



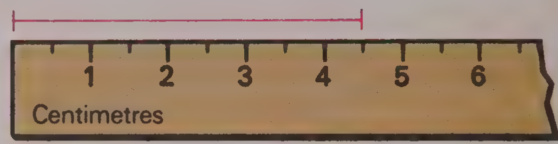
Investigating the Ideas

If the centimetre is the unit, how long is each segment ?





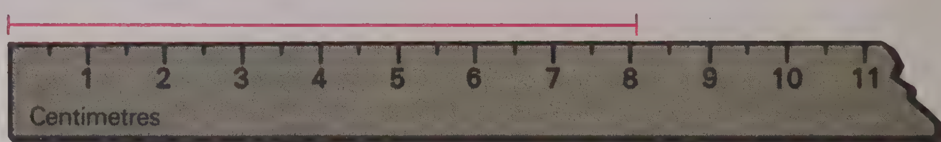
This segment is $4\frac{1}{2}$ centimetres long. (Read "four and one half.")



? Can you use your ruler to draw segments that have these lengths ?

A $3\frac{1}{2}$ cm **B** $5\frac{1}{2}$ cm **C** $1\frac{1}{2}$ cm

Discussing the Ideas

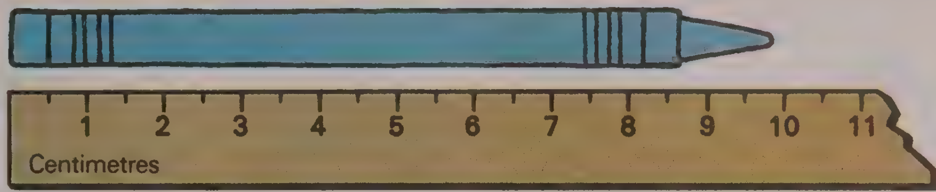


A Is the length of the segment closer to 8 centimetres or to $8\frac{1}{2}$ centimetres ? How can you tell ?

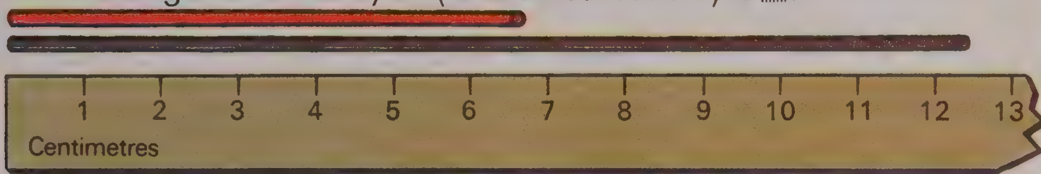
B The length of the segment (to the nearest of the marks that are one-half centimetre apart) is ▒.

2. What is the length of this segment to the nearest centimetre ?

3. Draw a segment that is longer than $4\frac{1}{2}$ centimetres, but whose length **to the nearest half centimetre** would be $4\frac{1}{2}$ cm.

1. Draw a square that has each side $6\frac{1}{2}$ centimetres long.
2. Draw a triangle with one side $4\frac{1}{2}$ centimetres long.
3. 

   A Is the length of the crayon closer to 9 or to 10 ?

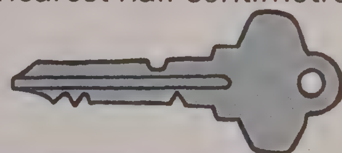
   B The length of the crayon (to the nearest cm) is ||||.
4. 

   A The length of the black rod (to the nearest half cm) is ||||.

   B The length of the red rod (to the nearest half cm) is ||||.

5. Give the length of each object to the nearest half centimetre.

   A 

   B 

   C 

6. Give the length of each object in exercise 5 to the nearest cm.

7. Give the length of each segment to the nearest centimetre.

   A ______________________ B

   C _____________________ D

   E ____ F

   G ________________________________ H

   I ____________________________ J

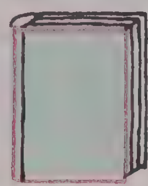
8. Give the length of each segment in exercise 7 to the nearest half centimetre.

More practice, page A-1, Set 1

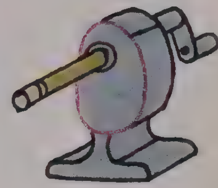
Investigating the Ideas

The red paths below suggest the **distance around**:


your waist


a book


a desk


the pencil sharpener

? Can you use a piece of string and your ruler to find the distance around some objects in your classroom?	Record your findings.

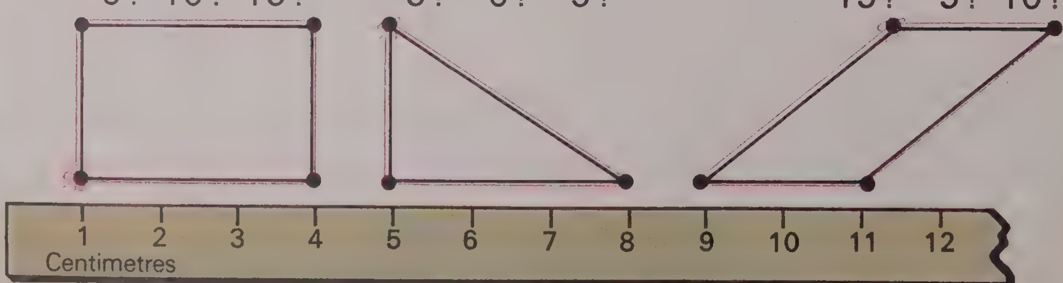
Discussing the Ideas

The distance around a figure is called the **perimeter**.

1. A How can you make a string rectangle on your bulletin board that has a perimeter of 72 centimetres?
   B Can you make string rectangles of different shapes, each having a perimeter of 72 cm?
   C What other figures can you make with perimeter 72 cm?

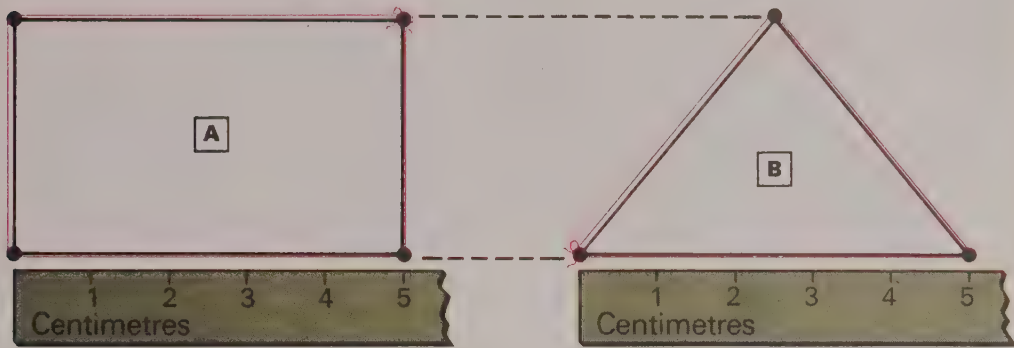
2. Think about the string around each figure. Choose the best estimate for the perimeter of each figure. Explain your choice.

6? 10? 15? 5? 6? 9? 15? 5? 10?

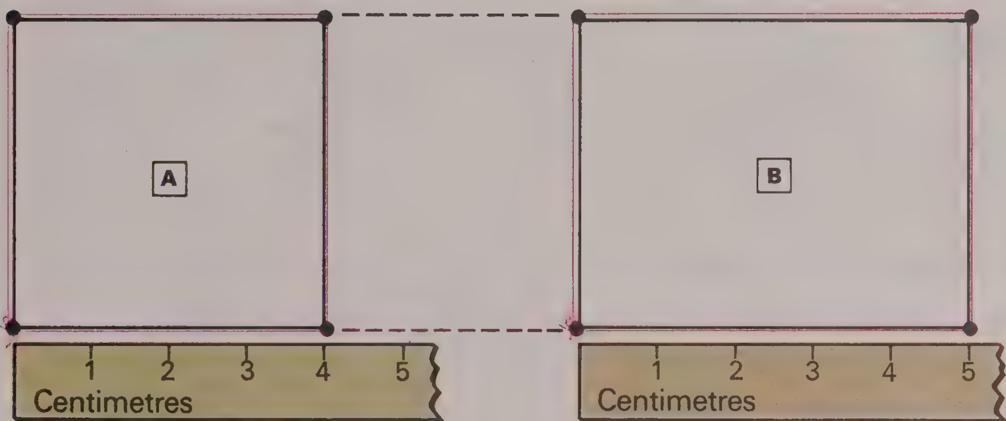


Think about measuring the red string that is wrapped around each figure. Without measuring, tell which figure, A or B, has the greater perimeter. Can you explain why?

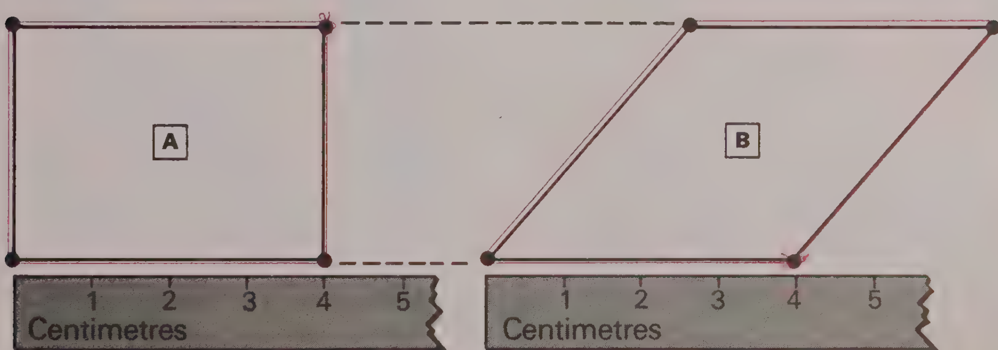
1.



2.

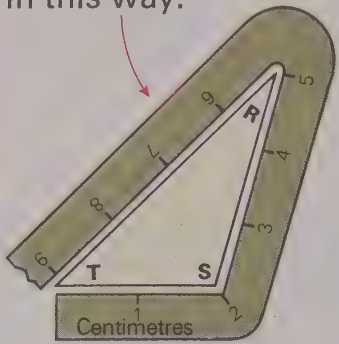


3.

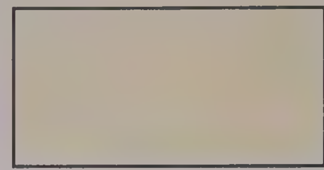


Investigating the Ideas

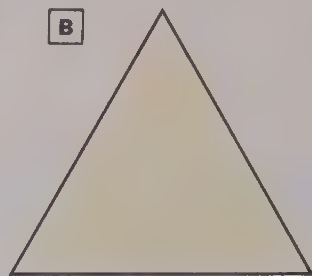
We could measure the perimeter of triangle RST easily **if** we could bend our ruler, like string, in this way.



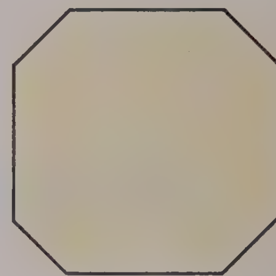
A



B



C

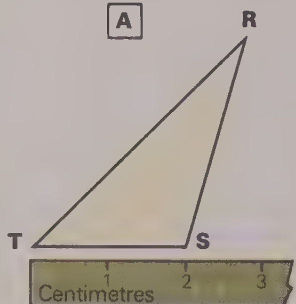


? Can you figure out a way to use only your centimetre ruler, **without bending it,** to measure the perimeter of each figure above ?

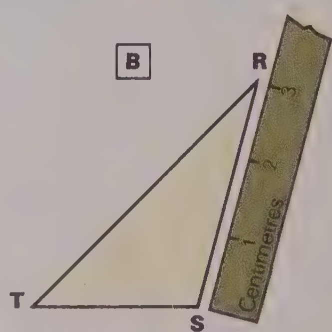
Discussing the Ideas

1. These pictures show how to measure the perimeter of triangle *RST*. Can you explain them ? What is the perimeter ?

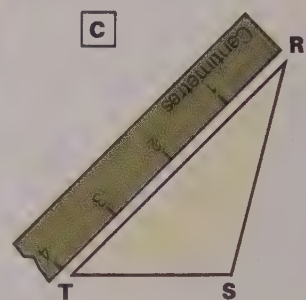
A



B

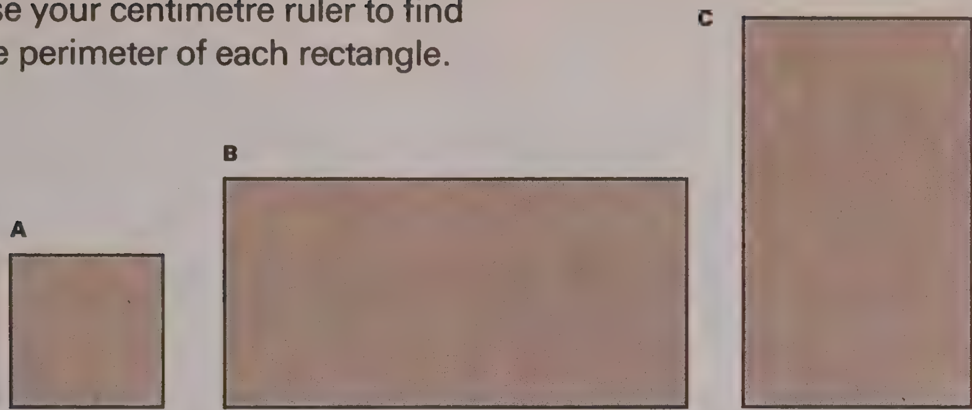


C

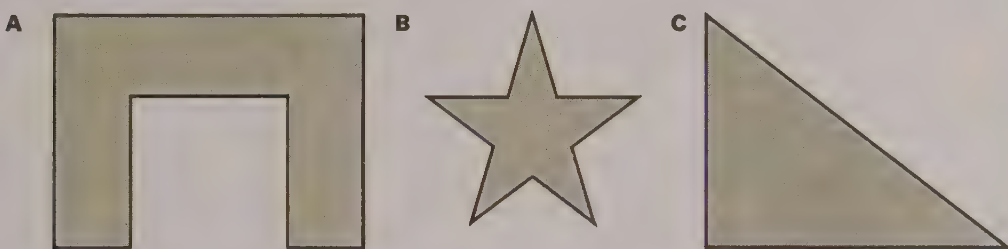


2. How did you find the perimeters of figures B and C in the Investigation ?

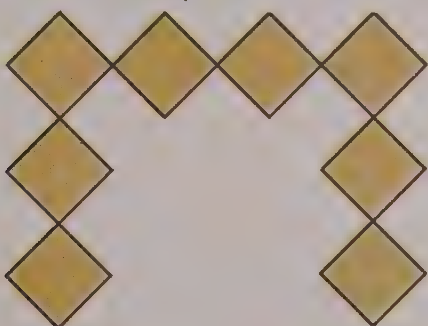
1. Use your centimetre ruler to find the perimeter of each rectangle.



2. Use a centimetre ruler to find the perimeter of each figure.



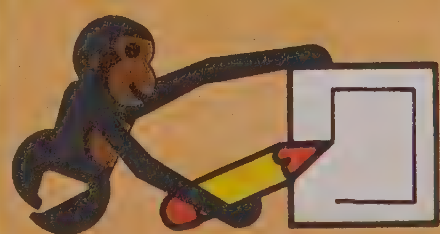
3. A What is the perimeter of this figure with 8 centimetre squares ?



B What is the smallest perimeter you can get by rearranging these 8 squares ? Draw a figure to show your answer.

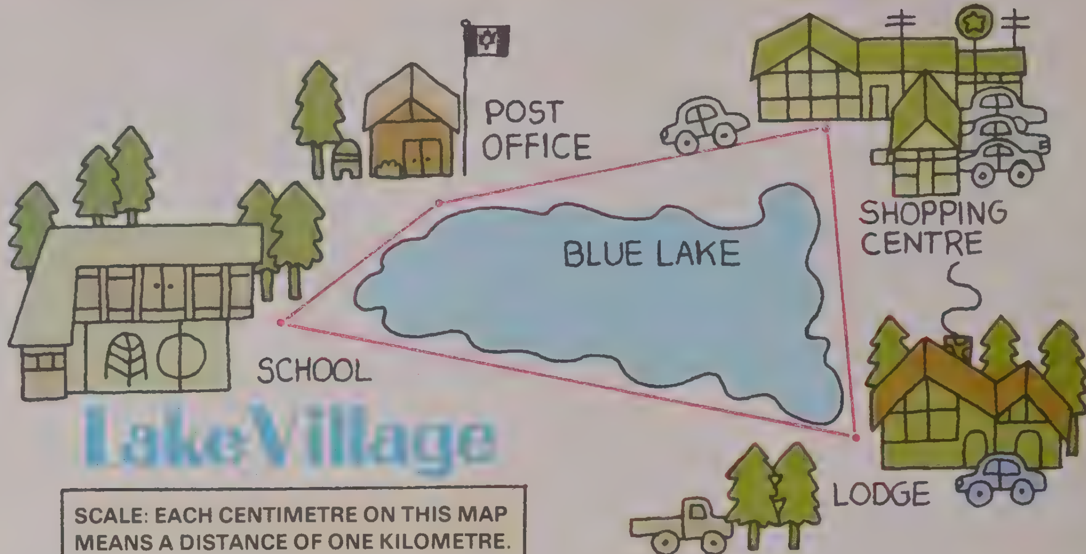
think

Using just whole numbers, how many rectangles can you draw that have a perimeter of 36 ?



More practice, page A-2, Set 2

Investigating the Ideas



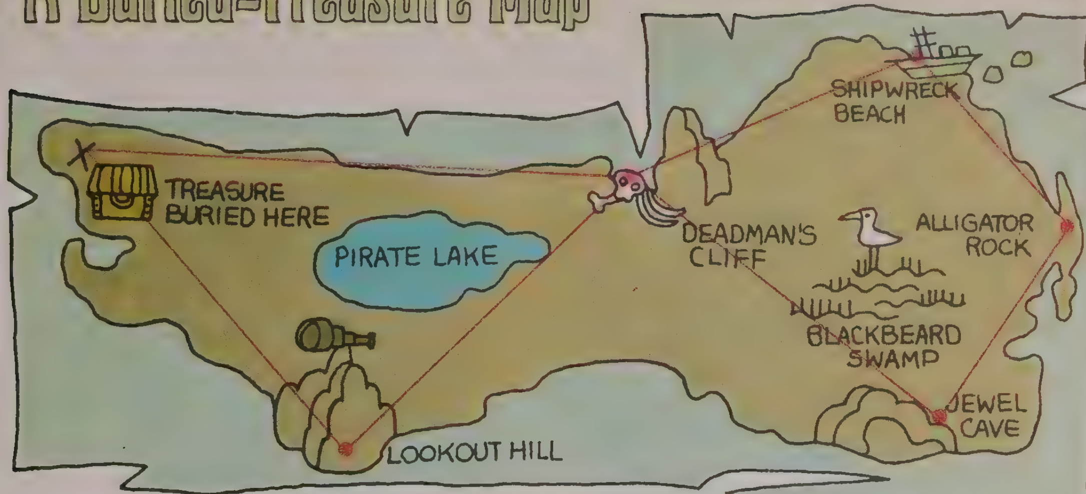
SCALE: EACH CENTIMETRE ON THIS MAP MEANS A DISTANCE OF ONE KILOMETRE.

?	Can you find the number of kilometres between any two places shown on this map ?	Record your findings.

Discussing the Ideas

1. Explain how you used the **scale** to help you find the distances on the map.
2. If you went from the school to the post office and then to the shopping centre, how many kilometres would you go ?
3. How many kilometres, to the nearest half kilometre, is it from the lodge to the shopping centre ?
4. About how far is it around the lake ?
5. ★ If you went across the lake in a boat from the lodge to the post office, about how many kilometres (to the nearest half kilometre) would you go ?

A Buried-Treasure Map



Hook Island

SCALE: EACH CENTIMETRE ON THIS MAP MEANS A DISTANCE OF ONE KILOMETRE.

When Dan was digging a hole to plant a tree, he found this map in a metal box. Answer the questions. Measure to the nearest centimetre.

1. How many kilometres from
   - A Alligator Rock to Shipwreck Beach?
   - B the cliff to the treasure?
   - C the cave to Lookout Hill?
   - D Lookout Hill to the treasure?
   - E the cliff to the cave?

2. Which is shorter, to go from Dead Man's Cliff straight to the treasure or to go from Dead Man's Cliff past Lookout Hill to the treasure? How many kilometres shorter?

3. How far must a crow fly to go from Alligator Rock straight to the treasure?

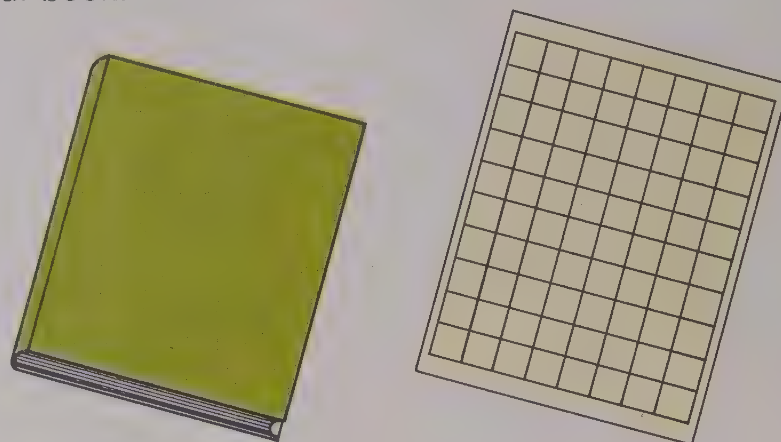
4. Which is shorter, to go from the cliff past the beach to Alligator Rock or to go from the cliff past Jewel Cave to Alligator Rock? How many kilometres shorter?

★ 5. If you start at Alligator Rock, which is the shortest path to the treasure? How many kilometres is it?

★ 6. What is the longest way from Alligator Rock to the treasure if you always use a path that takes you closer to the treasure?

Investigating the Ideas

Guess how many one-centimetre squares it would take to cover the front of your book.



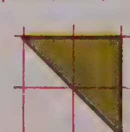
? Can you find a way to use one-cm graph paper to check your guess ?

Discussing the Ideas

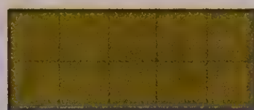
1. The number of squares it takes to cover a region is called the **area** of the region. The square is called the **unit of area**. What is the area of the cover of your book if the one-centimetre square is the unit ?

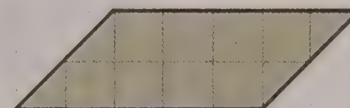
2. If the unit of area is this square 1, what is the area of each of these figures ? (The red lines may help you.)

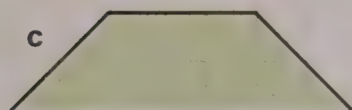
3. How can you prove that the area of this figure is 2 ?

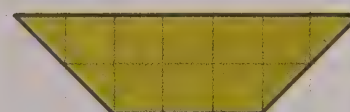


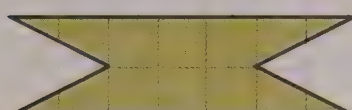
1. Find the number of square units (area) in each shaded region.
This  is the unit.

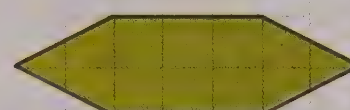
A


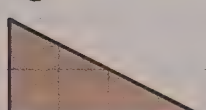
B


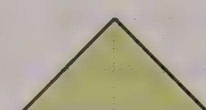
C


D


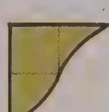
E


F


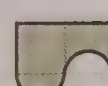
G


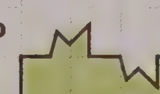
H


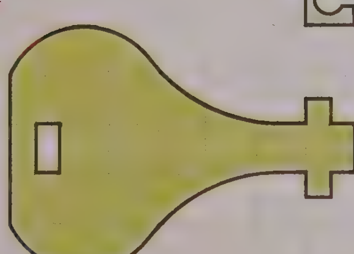
2. Estimate the area of each region.

A


B


C


D


E


F


Is there an easy way to find the area of a rectangle?

Investigating the Ideas

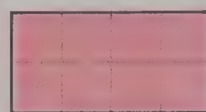
— unit of length

unit of area

A

4 in each row

2 rows



B

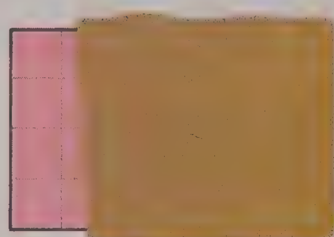
5 in each row

2 rows

C

6 in each row

4



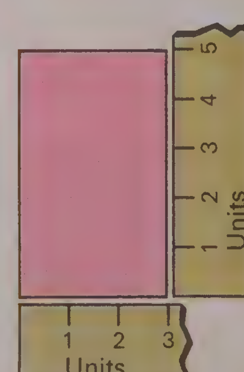
D

? Can you find the area of each rectangle even though part of it may be covered?

Discussing the Ideas

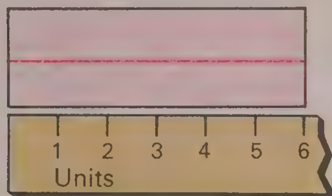
3 in each row

1. Can you explain an easy way to find the area of a rectangle?
2. What else do you need to know before you can find the area of this covered rectangle?
3. How can you use the rulers to help you find the area of the rectangle?

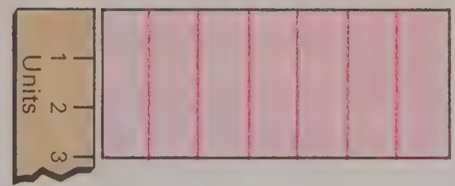


1. Give the area of each rectangle.

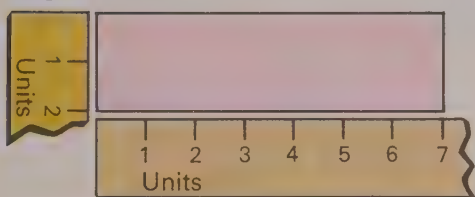
A



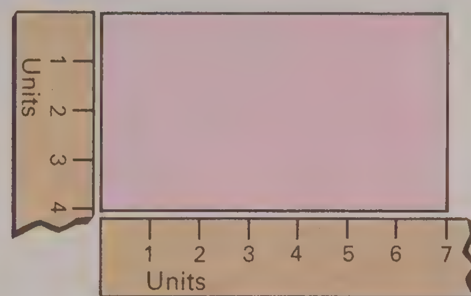
B



C

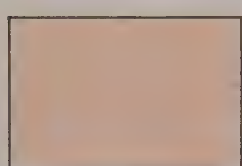


D

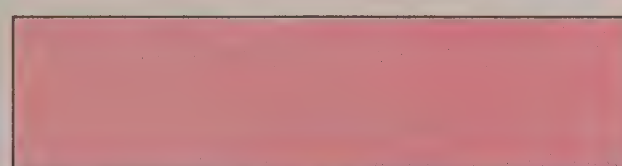


2. Use your centimetre ruler to find the area of each region.

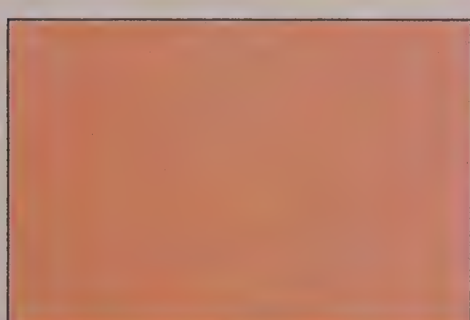
A



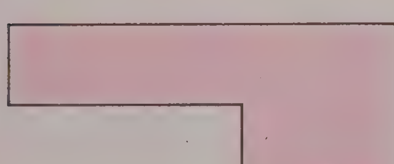
B



C

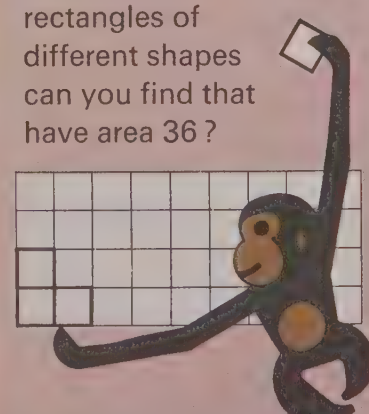


D



think

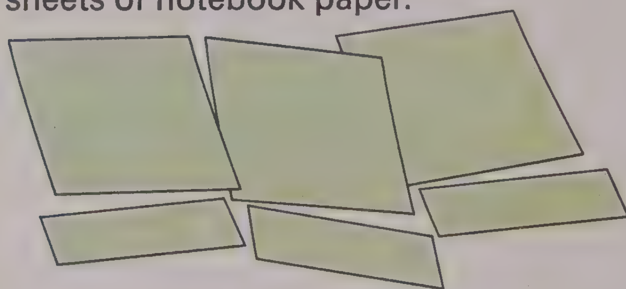
How many rectangles of different shapes can you find that have area 36?

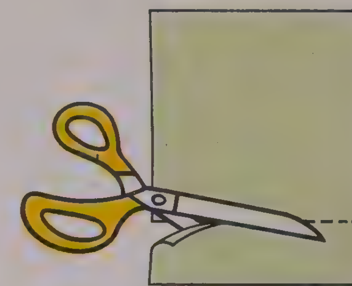


More practice, page A-2, Set 3

Investigating the Ideas

Cut four large squares from four sheets of notebook paper.

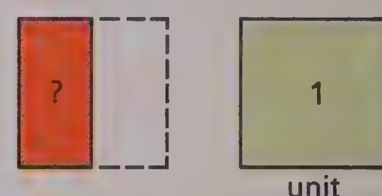




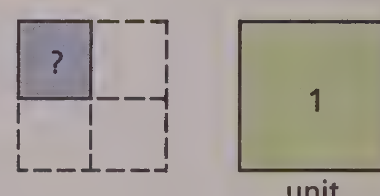
? Can you fold a square so that when you count parts of the same size you find 4 ? 8 ? 16 ? 3 ?

Discussing the Ideas

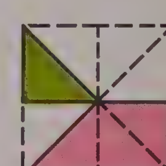
The red region is 1 of 2 parts needed to match the unit. The **area** of the red region is the fractional number $\frac{1}{2}$.



The blue region is 1 of 4 parts needed to match the unit. The area of the blue region is $\frac{1}{4}$.



1. A Can you give the area of the green region ?
   B What do you think is the area of the pink region ?



2. Draw a unit square on the chalkboard so that the paper square you used in the Investigation has area $\frac{1}{4}$.

1. The unit of area for each part is shown at the right. Give the missing numbers.

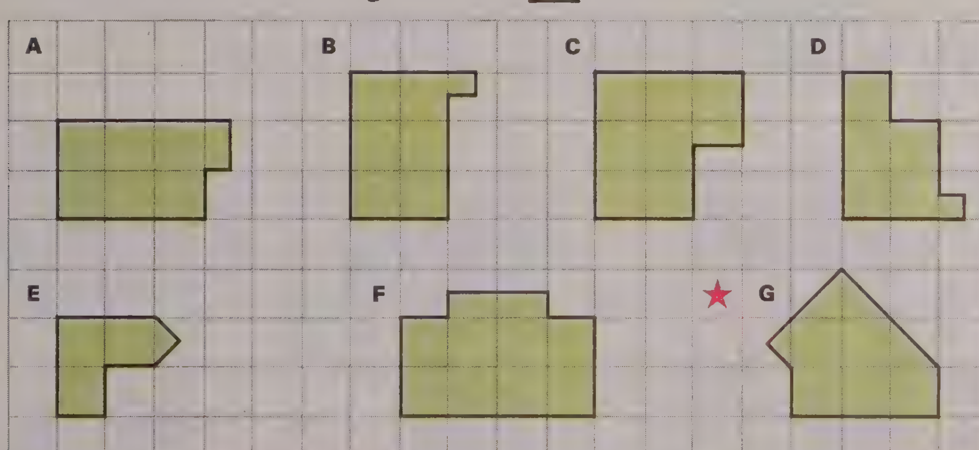
   A The purple region is __?__ of __?__ parts needed to match the unit. The area of the region is __?__.

   B The green region is __?__ of __?__ parts needed to match the unit. Its area is __?__.

   C The red region is __?__ of __?__ parts needed to match the unit. Its area is __?__.

   D The blue region is __?__ of __?__ parts needed to match the unit. Its area is __?__.

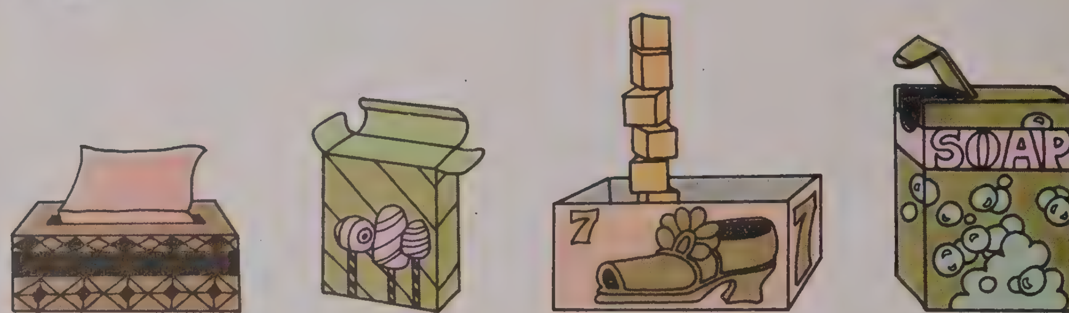
2. Find the area of each figure. This ☐ is the unit.



Investigating the Ideas

Choose or make several cubes that are the same size.

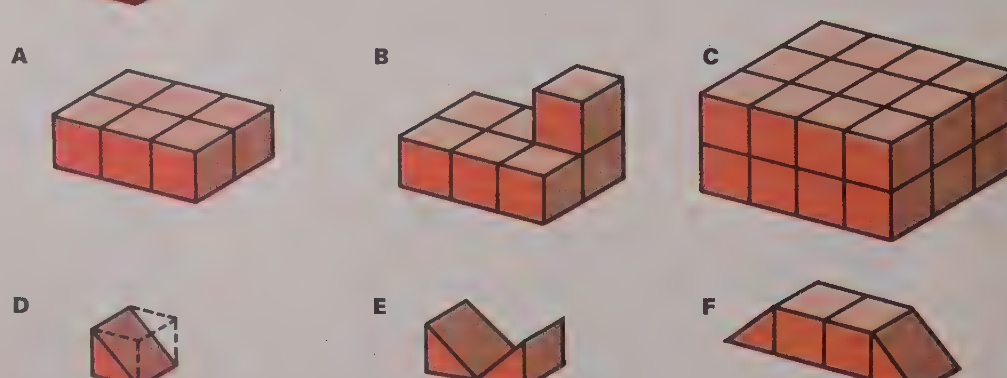
? Can you work with some classmates to find about how many of the cubes (neatly stacked) it takes to fill a box like one of these?



Discussing the Ideas

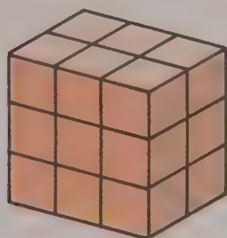
1. The number of cubes it takes to fill a space is called the **volume** of the space. The cube is the **unit** of volume. What is the volume of each of the boxes you used in the Investigation?

2. If this  is the unit, what is the volume of each figure?

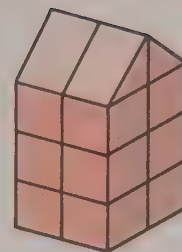


1. Find the volume of each figure.

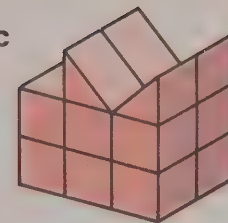
A



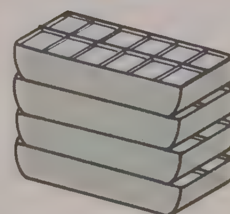
B



C

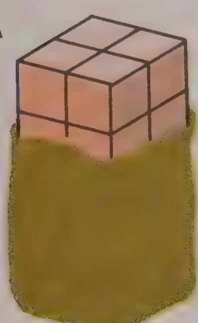


2. How many ice cubes would you have if you emptied all four of these full trays?



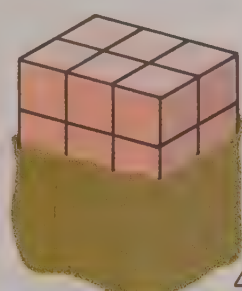
3. Find the volume of each figure even though parts of the figures are covered.

A



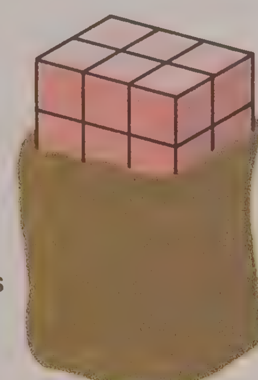
5 layers

B



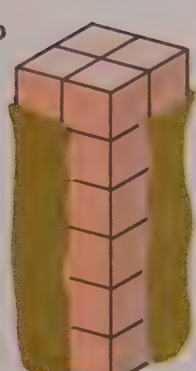
4 layers

C

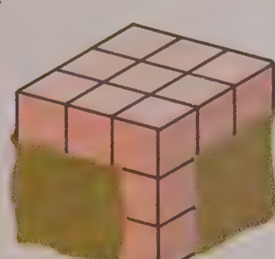


6 layers

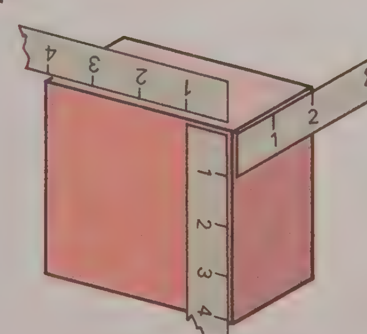
D



E



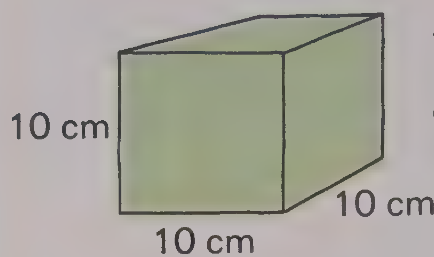
★ F



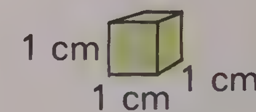
More practice, page A-3, Set 4

Investigating the Ideas

A litre is the unit used for liquid measure.



A box 10 centimetres on each edge holds about 1 litre. How many blocks 1 centimetre on each edge would the litre box hold?



A millilitre is a much smaller unit used for liquid measure. It takes one thousand millilitres to make a litre.

? What size cube would you need to hold a millilitre of liquid?

Discussing the Ideas

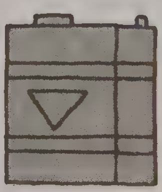
1. If a recipe calls for 1½ litres of milk and you have 1500 millilitres, do you have enough for the recipe?

2. If a jug holds a litre of syrup and it is ¾ full, how many more millilitres must be added to fill it?

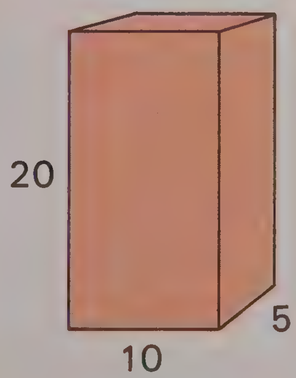
3. The volume of a container is 900 cubic centimetres. Will it hold a litre of water?

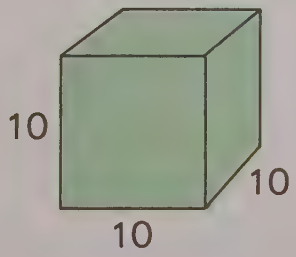
1. Give the word [millilitre(s) or litre(s)] that best completes each sentence.
   - A A glass holds 200 ___ ? ___ of milk.
   - B A tablespoon holds 20 ___ ? ___ of soup.
   - C A car's tank holds 80 ___ ? ___ of gasoline.
   - D A boy who drinks 4 big cups of cocoa drinks about 1 ___ ? ___ of cocoa.
   - E A perfume bottle might hold about 15 ___ ? ___.
   - F An engine might use 4 ___ ? ___ of oil.
   - G A pitcher that holds 1½ litres of tea holds 1500 ___ ? ___ of tea.

2. The volume of a 3-litre container is 3000 cubic centimetres. Estimate (in cubic centimetres) the volume of a milk carton that holds half as much.



★ 3. Karen made a box to hold one litre. Tom did too. The boxes did not look the same. Can you explain why?





Investigating the Ideas

3 METRES

metres	centimetres
1	200
2	100
2½	?

5 LITRES

litres	millilitres
3	?
3½	?
4½	?

MAY 25 DAYS

weeks	days
1	?
2	?
3	?

4 KILOGRAMS

kilograms	grams
2	?
2½	?
3	?

Use any measuring devices that might help you.

? Can you copy each table and give the missing numbers so that each row shows the same amount as the measurement given at the top?

Discussing the Ideas

1. If you are telling the height of a door that is 300 centimetres tall, which measurement in the table above will you probably use?
2. Suppose you have 6 tall glasses, each containing 250 millilitres. How many litres of milk would you have?
3. The month of May has 31 days. Explain how to write this using weeks and days.
4. How many 1-kilogram bags could you fill with 1037 grams of peanuts? How many grams would be left?

1. Copy the exercises below on your paper, and give as many of the missing numbers as you can. Look in the Tables of Measures at the back of the book to find the others.

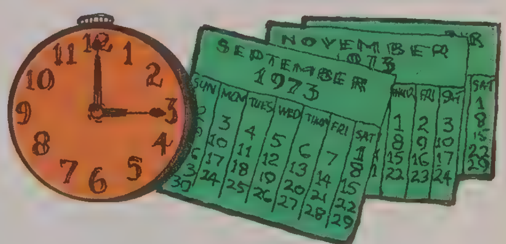
A 100 cm = ▮ m	E 1 min = ▮ s	I 1 wk = ▮ days
B 100 m = ▮ km	F 1000 ml = ▮ ℓ	J 12 mo = ▮ year
C 1 day = ▮ h	G 1000 g = ▮ kg	K 1 year = ▮ wks
D 1 h = ▮ min	H 1000 kg = ▮ t	L 2 years = ▮ days

2. Give the missing numbers.

A 2 h 75 min = 3 h ▮ min

B 15 min 90 s = ▮ min 30 s

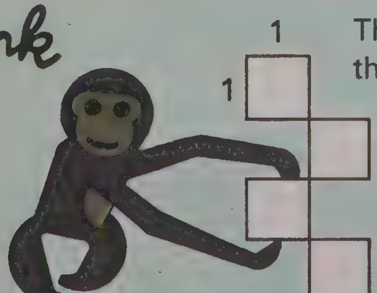
C 3 days 30 h = 4 days ▮ h



★ 3. Change each measure so that you have the greatest number of the larger unit. (Example: 3 weeks 10 days → 4 weeks 3 days)

A 2 days 30 h	E 3 kg 300 g	I 3 m 800 cm
B 5 ℓ 1000 ml	F 8 min 80 s	J 9 min 75 s
C 3 wk 20 days	G 3 h 62 min	K 7 wk 21 days
D 1 m 200 cm	H 0 ℓ 2000 ml	L 5 days 25 h

think



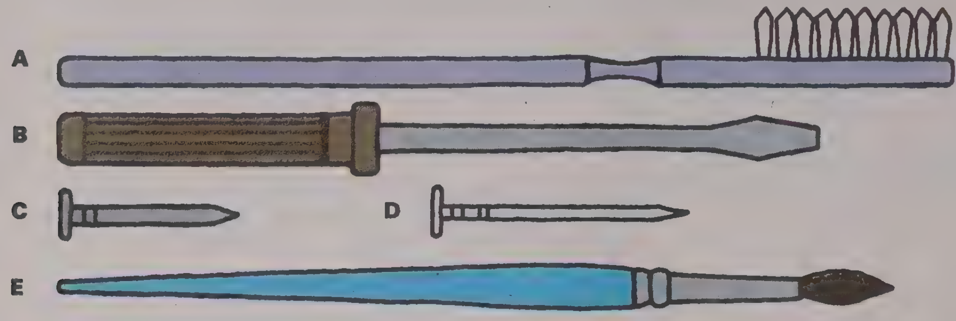
The perimeter of this figure is 16.

Arrange the squares to get a perimeter of:

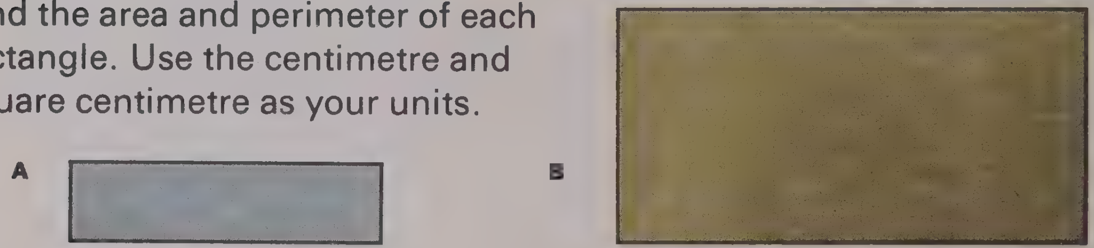
A 14 B 12 C 10

D 8 E 9 F 15

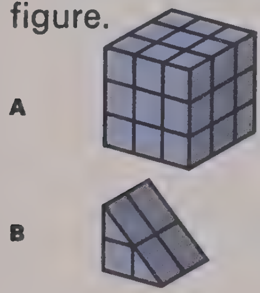
1. Give the length of each object to the nearest centimetre.



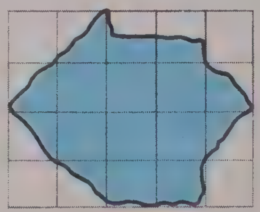
2. Find the area and perimeter of each rectangle. Use the centimetre and square centimetre as your units.



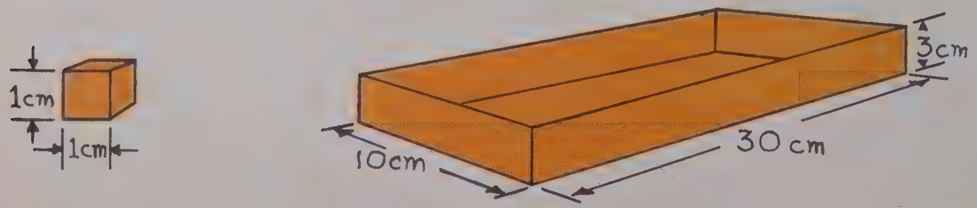
3. Give the volume of each figure.



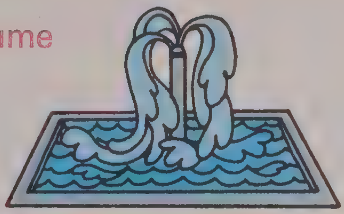
4. Estimate the area of this lake.
1 square unit on the map means
1 square kilometre of the lake.



★ 5. How many cubes, 1 centimetre on an edge, would fit in this shoe box cover?



6. Do you need to find length, area, or volume to answer each question?



A How deep is the pool?

B How much water does the pool hold?

C How large a piece of plastic must we buy to cover the pool?

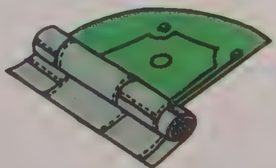
D How tall is the rocket?

E How many boxes will the truck hold?

F What size rug shall we buy to cover the floor?

G How high is the basket?

H How much room is inside the space capsule?



I How large is the canvas that covers the baseball diamond?

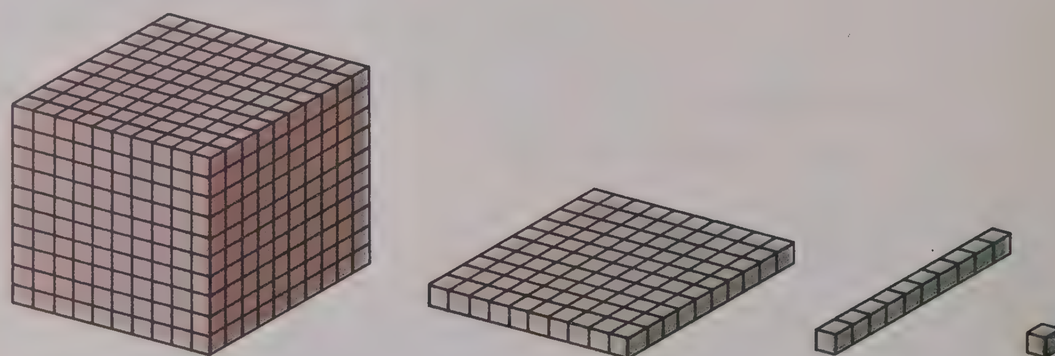
J What size belt do you wear?

2 Numbers and Numerals

Let's explore units, rods, layers, and blocks.

Investigating the Ideas

The block, layer, rod and unit are made of cubes which are the same size.



Block Layer Rod Unit

? Can you find the volume of the rod? the layer? the block?

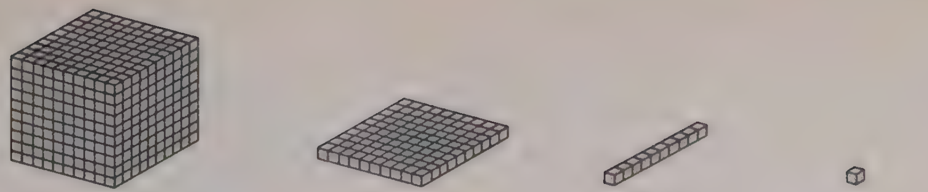
Discussing the Ideas

1. A How many units placed together make a rod?
   B How many rods placed together make a layer?
   C How many layers placed on top of each other make a block?

2. Here is a record of the number of **blocks, layers, rods,** and **units** Joe has. If he exchanges them all for units, how many units will he have?

blocks	layers	rods	units
0	3	7	8

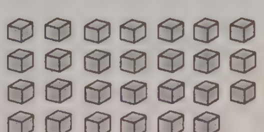
1.



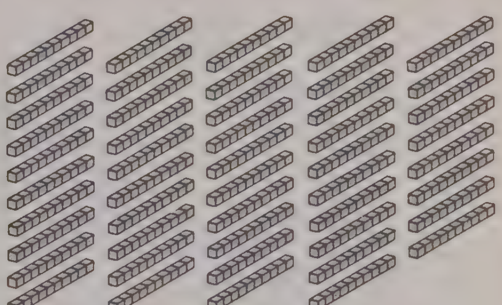
Thousand-block Hundred-layer Ten-rod One-unit

A You can trade in a ten-rod and get __?__ one-units.
B You can trade in a hundred-layer and get __?__ ten-rods.
C You can trade in a thousand-block and get __?__ hundred-layers.
D You can trade in __?__ one-units and get a ten-rod.
E You can trade in __?__ ten-rods and get a hundred-layer.
F You can trade in __?__ hundred-layers and get a thousand-block.

2. A How many one-units are shown here?
B If you trade in as many as you can for ten-rods, how many ten-rods would you get? How many one-units would you have left?



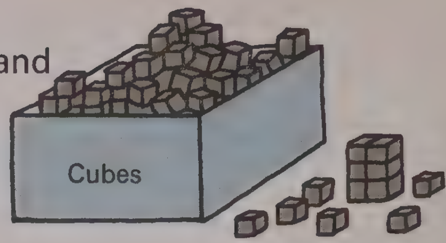
3. A How many ten-rods are shown here?
B If you trade in as many as you can for hundred-layers, how many hundred-layers would you get? How many ten-rods would you have left?



★ **4.** Suppose this is a record of all the **T**housand-blocks, **H**undred-layers, **T**en-rods, and **O**ne-units you have. What will the record look like after you make all of the trades that can be made?

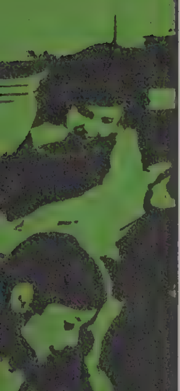
Th	H	T	O
2	26	24	32
3	16	24	32

Investigating the Ideas



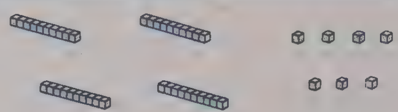
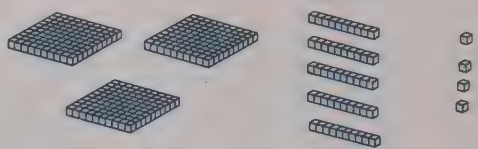
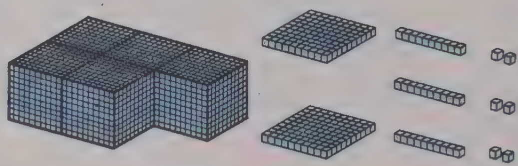
Suppose you have 367 wooden cubes and could glue them together to end up with block pieces, layer pieces, rod pieces, and unit pieces.

? How many blocks, layers, rods, and units would you have if you tried to end up with the fewest possible pieces?



Discussing the Ideas

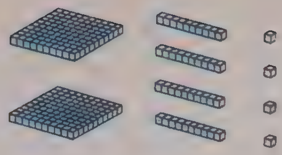
1. We use the idea of **place value** and the **digits** (0, 1, 2, 3, 4, 5, 6, 7, 8, and 9) to write a **numeral** that tells how many units are in each set below.

<table>
<tr><th></th><th>We see</th><th>We think</th><th>We write</th></tr>
<tr><td>A</td><td></td><td><table><tr><th>T(tens)</th><th>O(ones)</th></tr><tr><td>4</td><td>7</td></tr></table></td><td>47</td></tr>
<tr><td>B</td><td></td><td><table><tr><th>H(hundreds)</th><th>T</th><th>O</th></tr><tr><td>3</td><td>5</td><td>4</td></tr></table></td><td>354</td></tr>
<tr><td>C</td><td></td><td><table><tr><th>Th(thousands)</th><th>H</th><th>T</th><th>O</th></tr><tr><td>5</td><td>2</td><td>3</td><td>6</td></tr></table></td><td>5236</td></tr>
</table>

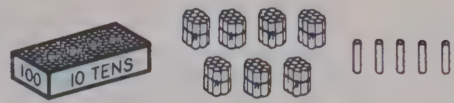
How would you read the numerals in A, B, and C?

2. A What digit is in the tens' place in A? in B? in C?
B What digit is in the hundreds' place in B? C?
C What digit is in the thousands' place in C?

1. Write a numeral that tells how many units all together.



2. Each bundle contains ten sticks. Each box contains one hundred sticks. Write a numeral that tells how many sticks all together.



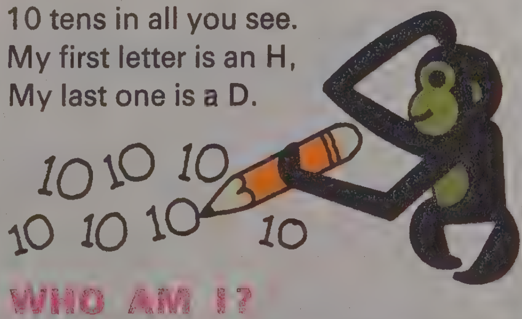
3. Write a numeral for each exercise.
   - A 5 tens and 9 ones
   - B 6 tens and 4 ones
   - C 3 tens and 0 ones
   - D 3 hundreds, 9 tens, and 4 ones
   - E 6 hundreds, 0 tens, and 7 ones
   - F 5 thousands, 7 hundreds, 4 tens, and 8 ones

4. Give the missing digits.
   - A 39 means ▒ tens and ▒ ones.
   - B 93 means ▒ tens and ▒ ones.
   - C 597 means ▒ hundreds, ▒ tens, and ▒ ones.
   - D 8723 means ▒ thousands, ▒ hundreds, ▒ tens, and ▒ ones.

5. Solve the equations.
   - A $32 = 30 + n$
   - B $98 = n + 8$
   - C $324 = 300 + 20 + n$
   - D $836 = n + 30 + 6$
   - E $409 = 400 + n + 9$
   - F $380 = 300 + 80 + n$
   - G $277 = n + 70 + 7$
   - H $699 + 1 = n$
   - I $999 + 1 = n$

think

I'm one more ten than 90,
10 tens in all you see.
My first letter is an H,
My last one is a D.



WHO AM I?

More practice, page A-3, Set 5

Do you know the number names up to one thousand?

Discussing the Ideas

1. A Count by tens to ninety. Then count by ones to ninety-nine.
   B **Before** the extra stick is added, there are

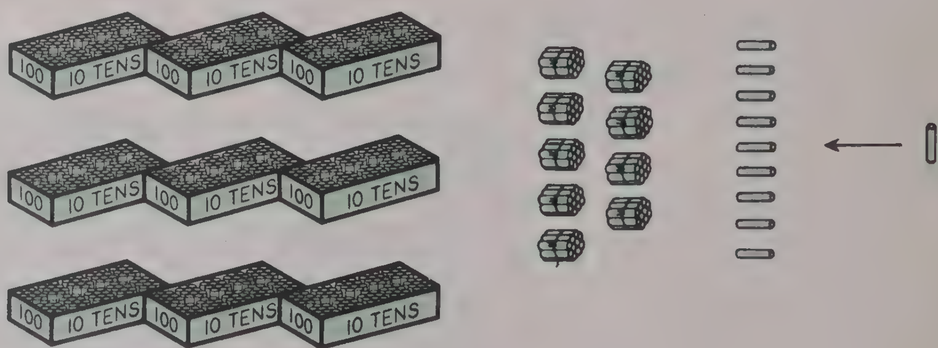
   ? tens and ? ones.

   After the extra stick is added, there are
   ? tens and ? ones.

   C How do you read and write the numerals for the number of sticks before and after?

2. A Count by hundreds to 900, by tens to 990, and by ones on to nine hundred ninety-nine.
   B **Before** the extra stick is added, there are

   ? hundreds, ? tens, and ? ones.



   After the extra stick is added, there are

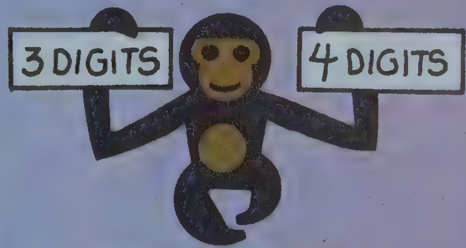
   ? hundreds, ? tens, and ? ones.

   C Can you write the numerals for the number of sticks before and after?

1. Write the numeral for each exercise.
   - **A** three hundreds, five tens, and two ones
   - **B** eight hundreds, three tens, and seven ones
   - **C** nine hundreds, eight ones, and three tens
   - **D** six tens, four ones, and eight hundreds
   - **E** five ones, four tens, and three hundreds
   - **F** one hundred, nine tens, and four ones
   - **G** three hundred ninety-four
   - **H** seven hundred sixty-eight
   - **I** four hundred forty
   - **J** four hundred four

think

I'm a special number,
With 3 digits and no more.
Increase me by just one,
And the digit count is 4.

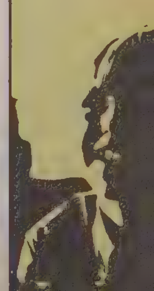


WHO AM I?

2. Write the numeral for the number that is
   - **A** just before 200.
   - **B** just after 799.
   - **C** just before 250.
   - **D** just after 899.
   - **E** just before 610.
   - **F** just after 990.

3. Write the numeral for the number with
   - **A** 3 hundreds, 5 tens, 7 ones.
   - **B** 8 tens, 7 hundreds, 6 ones.
   - **C** 8 hundreds, 0 tens, 0 ones.
   - **D** 9 hundreds, 5 ones, 0 tens.

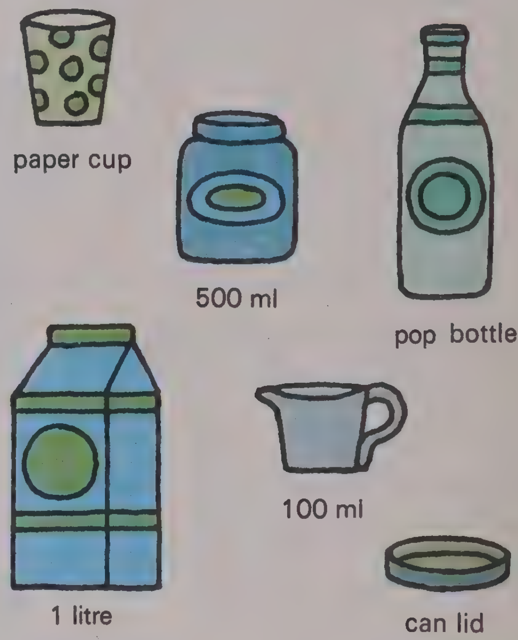
★ 4. Solve the equations.
   - **A** $99 + 1 = n$
     $100 + 99 = n$
   - **B** $199 = 100 + n$
     $199 + 1 = n$
   - **C** $299 = 200 + n$
     $299 + 1 = n$
   - **D** $399 = 300 + n$
     $399 + 1 = n$
   - **E** $599 = n + 99$
     $599 + 1 = n$
   - **F** $899 = 800 + n$
     $899 + 1 = n$



Investigating the Ideas

Guess which container shown would most nearly be filled by

- 1000 grains of rice.
- 1000 grains of popcorn.
- 1000 drops of water.
- 1000 navy beans.
- 1000 lima beans.



? Can you find a way to check one of your guesses ?

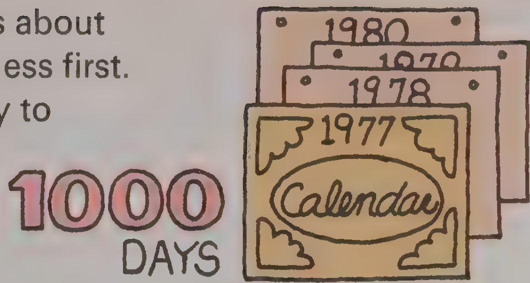
Discussing the Ideas

1. If you could count to 100 in about 1 minute, about how long do you think it would take you to count to 1000 ? How many hundreds are in 1000 ?

2. About how many of your classmates would have to get on the scales together to weigh 1000 kilograms ?

3. If 100 centimetres is 1 metre, about how many metres make 1000 centimetres ? Can you throw a ball 1000 cm ?

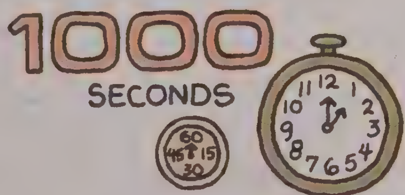
1. One thousand days is about how many years? Guess first. Then try to find a way to check your guess.



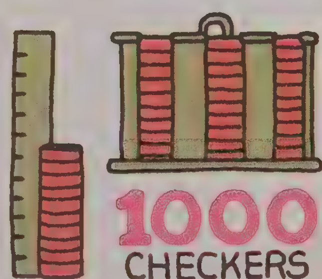
2. How thick is a book with 1000 pages? Choose 5 books of different sizes. See how close you can come to guessing the number of pages in each book. Does the thickness of the page make a difference in your guess?

3. How far is 1000 centimetres? Make a guess and then check your guess.

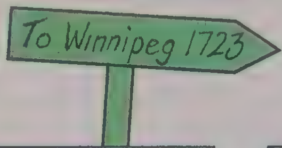
4. Is 1000 seconds more than one hour? Find a way to decide.



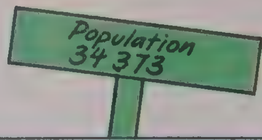
★ 5. How tall is a stack of 1000 checkers? Can you measure the height of a stack of 10 checkers and use this information to figure out the answer?



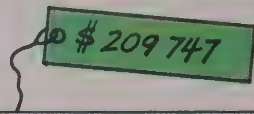
Investigating the Ideas



Find a distance between two cities that uses a 4-digit numeral.



Find two cities with populations shown by 5-digit numerals.



Find two examples that use 6-digit numerals.

? Can you use a reference book to find the information needed in the boxes above?

Record the names and numbers you find.

Discussing the Ideas

1. In a 4-digit numeral, which digit tells how many thousands? hundreds? tens? ones?

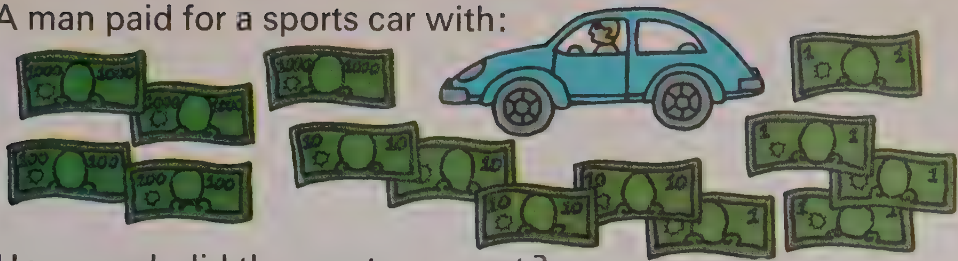
2. Read the numerals you found above.

3. Write five 4-digit numerals on the chalkboard. Tell how many thousands, hundreds, tens, and ones. Then read the numerals.

4. A What is the largest number named by a 4-digit numeral?
   B What is the largest number named by a 5-digit numeral?
   C What is the largest number named by a 6-digit numeral?

5. What are the hundreds' and thousands' digits in a certain 4-digit numeral that appears in the newspaper every day?

1. A man paid for a sports car with:



How much did the sports car cost?

2. Give the missing digits in the order indicated.
   - A 3476 means ▯ thousands, ▯ hundreds, ▯ tens, and ▯ ones.
   - B 4007 means ▯ thousands, ▯ hundreds, ▯ tens, and ▯ ones.
   - C 25 479 means ▯ ten thousands, ▯ thousands, ▯ hundreds, ▯ tens, and ▯ ones.
   - D 681 493 means ▯ hundred thousands, ▯ ten thousands, ▯ thousands, ▯ hundreds, ▯ tens, and ▯ ones.

3. Write the correct numeral for each exercise.
   - A six thousands, five hundreds, four tens, and three ones
   - B three thousand seven hundred sixty-two
   - C nine thousands, zero hundreds, four tens, and five ones
   - D nine thousand thirty-five
   - E eight ten thousands, four thousands, six hundreds, zero tens, and seven ones
   - F seven hundred thousands, five ten thousands, nine thousands, zero hundreds, zero tens, and three ones

4. Solve the equations.
   - A $2856 = 2000 + 800 + 50 + n$
   - B $3495 = 3000 + 400 + n + 5$
   - C $9765 = n + 700 + 60 + 5$
   - D $82\,763 = n + 2000 + 700 + 60 + 3$
   - E $765\,114 = n + 60\,000 + 5000 + 100 + 10 + 4$

think

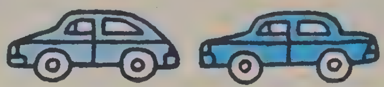
How many different 4-digit numerals can you write by using each of the digits 1, 2, 3, and 4 only once in each numeral?

More practice, page A-4, Set 6

Investigating the Ideas

? Can you complete one of these investigations?

Find the prices of two cars you like. Decide which costs more.



Find the heights of two of the tallest buildings in the world. Decide which is taller.

Find the distances from your home to two places you would like to visit. Decide which is farther away.

Find the lengths of two rivers. Decide which is longer.

Discussing the Ideas

1. Three digits are covered in each salary number. Could Mr. A's salary possibly be more than Mr. B's? Explain.

Mr. A's salary: $8

Mr. B's salary: $9

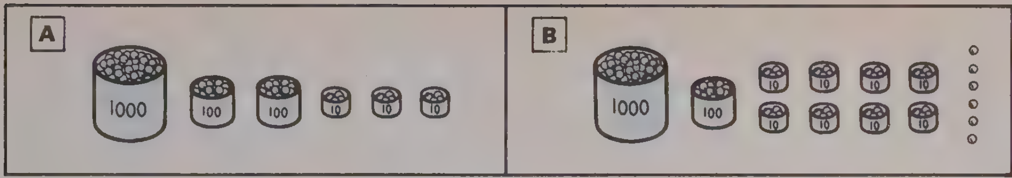
2. Each of these numbers has the same thousands' digit. If you could see one more digit in each to find out who made more hits, which digit would you choose? Explain.

Total number of major league hits	
Willie Mays:	3
Hank Aaron:	3

3. How do you decide which of these statements is true?

A 35 798 > 35 801

B 35 798 < 35 801

1. 

The numerals on the cans tell how many marbles are inside. Which picture (A or B) has the greater number of marbles?

2. In each exercise, write the sign (<, >) that should go in each ●. Then write the words (greater than, less than) that should go in each blank.

A 730 ● 73
730 is __?__ 73.

B 703 ● 730
703 is __?__ 730.

C 7300 ● 7030
7300 is __?__ 7030.

D 42 593 ● 42 583
42 593 is __?__ 42 583.

E 65 423 ● 65 523
65 423 is 100 __?__ 65 523.

F 126 742 ● 125 742
125 742 is 1000 __?__ 126 742.

G 483 762 ● 483 672
483 762 is __?__ 483 672.

H 95 461 ● 95 164
95 164 is __?__ 95 461.

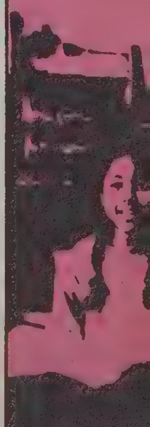
3. Give the number that is 100 more than

A 7. B 27. C 327. D 5327. E 32 007. F 72 700. G 2341. H 900. I 438 900. ★ J 999 900.

4. Give the number that is 1000 less than

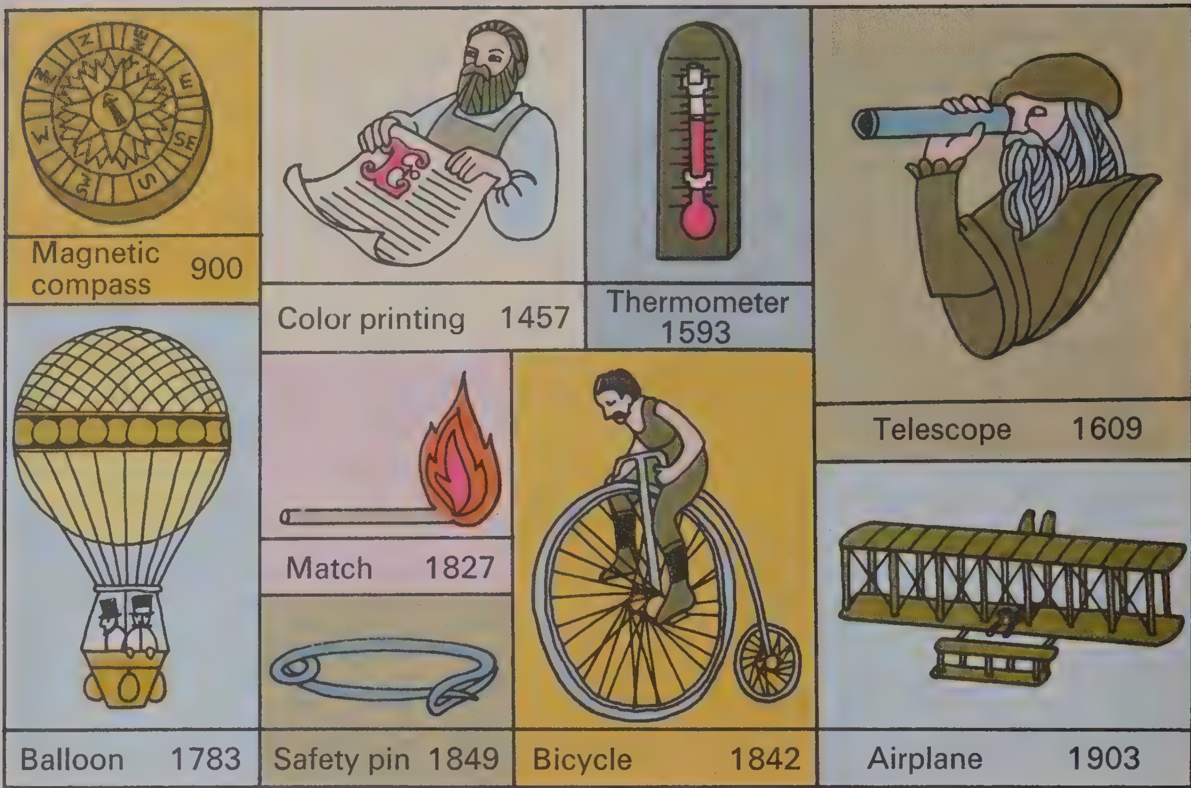
A 2000. B 5234. C 5003. D 31 900. E 61 004. F 1000. G 310 000. H 845 900.

★ 5. A Give the largest 3-digit number that has the digits 2 and 5.
B Give the smallest 3-digit number that has only one 0 digit.
C Give the smallest 4-digit number that has the digits 5 and 3.
D Give the largest 5-digit number that has the digits 4, 7, 8, 0, 5.
E Give the largest 6-digit number with no two digits alike.



More practice, page A-5, Set 7

INVENTIONS



A decade is a period of 10 years.
A century is a period of 100 years.
A millennium is a period of 1000 years.

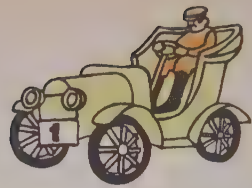
You have lived about a decade. Very few people have lived for a century. Use the chart and your knowledge of place value to answer the questions.

1. The sewing machine was invented 3 years later than the match. When was the sewing machine invented?

2. The bicycle tire was invented 4 decades later than the safety pin. When was the bicycle tire invented?

3. The adding machine was invented 2 centuries earlier than the bicycle. When was the adding machine invented?

4. The match was invented 6 decades before the gasoline auto. When was the gasoline auto invented?



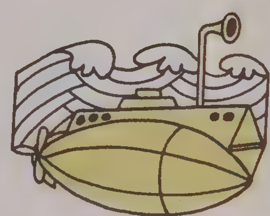
5. The piano was invented 10 decades after the telescope. Give the year in which the piano was invented.

6. The fountain pen was invented 1 century and 1 year after the balloon. In what year was the fountain pen invented?

7. The movie machine (projector) was invented 4 centuries and 1 year after Columbus discovered America. When was the projector invented?

8. Leonardo Da Vinci learned about flight by watching birds. He drew a picture of an airplane about 400 years before the airplane was invented. In what year did Da Vinci draw the picture?

9. The first modern naval submarine was built about 10 centuries after Chinese sailors invented the magnetic compass. About when was the first naval submarine built?

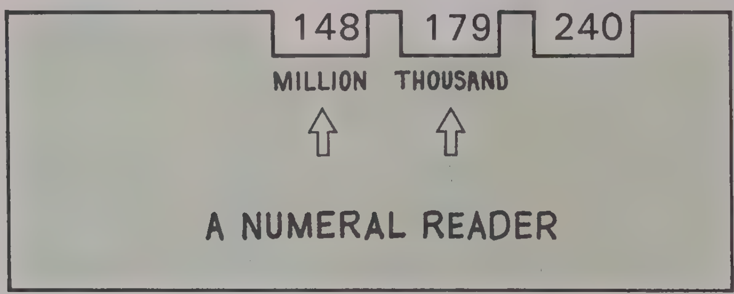


10. What will be the date one millennium after the invention of the thermometer?

11. Suppose that when the first sheet of color printing was made it was sealed in a block of stone. If it is discovered 3000 years later, what year will that be?

Investigating the Ideas

Use the numeral reader to read the sentence below.
The average distance from earth to our sun is:



? Can you make a copy of the numeral reader and use it to read these numerals?

	8	427
	237	809
53	745	626

Discussing the Ideas

1. How would you use your numeral reader to read these numerals?
   - A 5 280
   - B 36 198
   - C 29 002
   - D 2 592
   - E 46 719 845
   - F 971 635 887

2. What is the largest number you can read with your numeral reader?

3. Explain how you can use your numeral reader to help you write the numeral for these names.
   - A seventy-two thousand, one hundred fifty-four
   - B nine million, four hundred fifty-three thousand, eight hundred nineteen

1. Give the number of thousands. Read the numeral by using your numeral reader.

A 3 942
B 10 536
C 408 212
D 409 636
E 82 746 962
F 438 986 503

2. Use your numeral reader to help you write the numeral for each exercise.

A eight thousand, six hundred thirty-five
B twenty-eight thousand, four hundred twenty-seven
C nine hundred thirty-six thousand, two hundred five
D four million, seven hundred ninety-six thousand, seventy-three

3. Give the number 1000 greater than each of these.

A 1342
B 23 157
C 249 361
D 399 264
E 409 317
F 300 007
G 300 876
H 950 304

4. In each numeral below, one digit is red. Give the number the red digit stands for.
Example: 27 341
(Answer: 7000)

A 28 436
B 382 984
C 675 832
D 637 243
E 513 200
F 983 741
G 200 700
H 622 317
I 307 460
J 999 999
K 436 872
L 923 465
M 345 872
N 407 600

Five digits I possess.
Yet were I just one less,
I'd have five no more
And be left with only four.

WHO AM I?

More practice, page A-5, Set 8

Investigating the Ideas

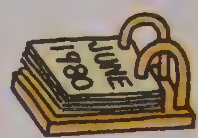
? Can you guess the correct answer for each question?

A There would be about 1 000 000 hairs on the heads of __?__ students. (2; 10; more than 20)

B The weight of ___ ? ___ busloads of students would total 1 000 000 kilograms. (less than 20; about 90; more than 200)

C A mathematics book with 1 000 000 pages would need a bookshelf as long as __?__ parked cars? (1; 5; 10)

D A person who has lived 1 000 000 hours is __?__ years old. (10; 50; over 110)



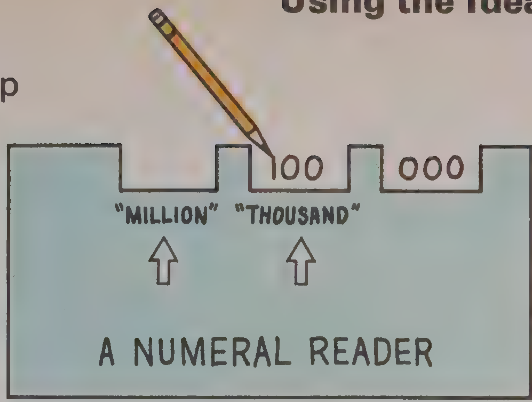
Discussing the Ideas

1. A How long do you think it would take you to count to 1 million if you said one number each second?
   B Was your guess too small or too large?

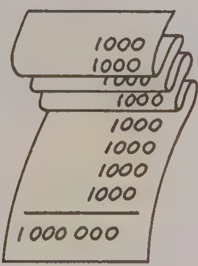
2. What number comes just before 1 million? Show how to write this number.

1. Use your numeral reader to help you write these numerals.

A five hundred thousand
B six hundred thousand
C seven hundred thousand
D eight hundred thousand
E nine hundred thousand
F ten hundred thousand (one thousand thousand)



2. How many thousands does it take to make 1 000 000?



3. Use your numeral reader to help you write these numerals.

A nine hundred ninety-nine thousand, nine hundred ninety-eight
B nine hundred ninety-nine thousand, nine hundred ninety-nine
C the next numeral after the one in B

4. Write the number that is

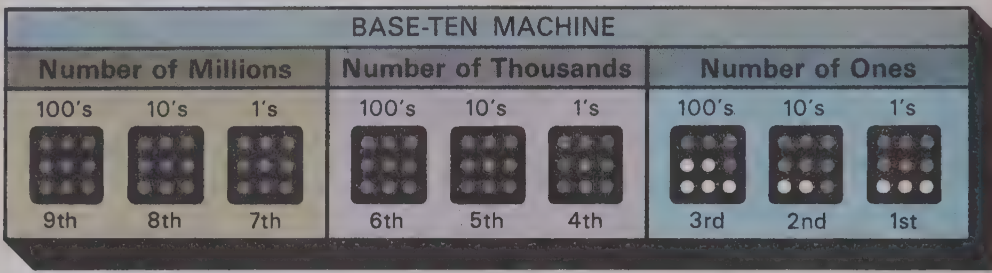
A 100 more than one million.
B 1000 more than one million.
C 10 more than one million.
D 1 more than one million.
E 10 000 more than one million.
F three million more than 324 562 218.
G thirty million more than 812 469 855.
H five hundred million more than 283 618 962.

There are many times that I
Would like to be one more.
Then I would have five digits,
Instead of only four.

WHO AM I?

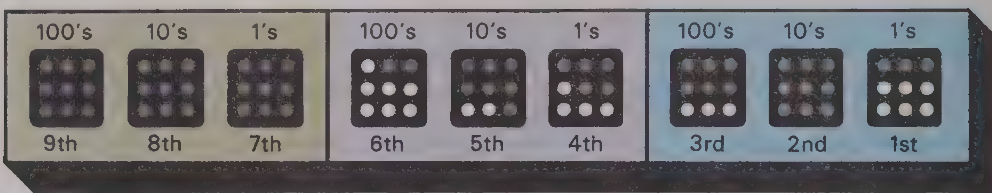
Investigating the Ideas

A card gave the machine a signal to remember the number 523. The lights show how the machine works.

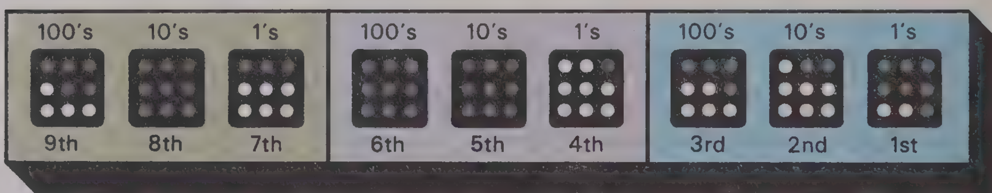


? Can you give the number that the machine was signalled to remember in each part below ?

A



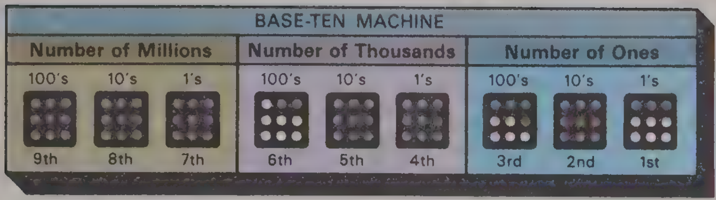
B



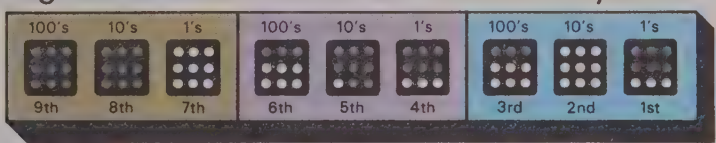
Discussing the Ideas

1. The 1st, 2nd, and 3rd places on the machine tell the number of ones. Which places on the machine tell how many thousands ?   millions ?

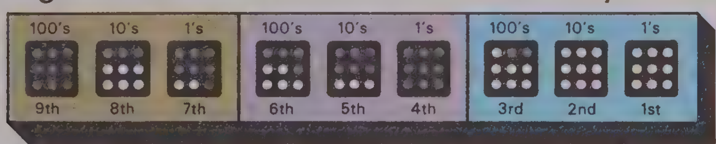
2. Explain what lights would be on if the machine were signalled to remember 9 009 009.



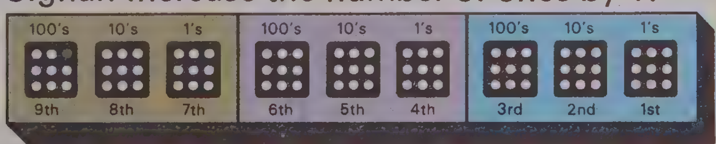
1. Give the number the machine was signalled to remember.
2. A card is put into the machine. It signals the machine to increase the number of ones by 4.
   A How many lights are now on in the 1st place?
   B How many lights do you think are on in the 2nd place?
3. Another card signals the machine to increase the number of hundreds by 5.
   A How many lights are now on in the 3rd place?
   B How many lights are on in the 4th place?
4. Another card signals the machine to increase the number of hundred thousands by 5.
   A How many lights are now on in the 6th place?
   B How many lights are now on in the 7th place?
5. Give the number that results when each signal is given to the machine shown.
   A Signal: Increase the number of tens by 1.

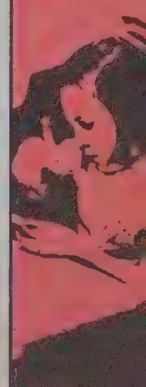


   B Signal: Increase the number of ones by 1.



   C Signal: Increase the number of ones by 1.





Solving Story Problems

Populations of 10 Canadian Metropolitan Areas*

Metropolitan Area	Number of People
Calgary, Alberta	400 154
Edmonton, Alberta	490 811
Hamilton, Ontario	495 864
Montreal, Quebec	2 720 413
Niagara-St. Catharines, Ontario	301 108
Ottawa-Hull, Ontario-Quebec	596 176
Quebec, Quebec	476 232
Toronto, Ontario	2 609 638
Vancouver, British Columbia	1 071 081
Winnipeg, Manitoba	534 685

1. Is the number of people in the Montreal area closer to 2 000 000 or 3 000 000 ?

2. Is the number of people in the Ottawa-Hull area closer to 500 000 or 600 000 ?

3. Is the number of people in the Vancouver area closer to 1 000 000 or 2 000 000 ?

4. We say: The number of people in the Hamilton area **(to the nearest thousand)** is 496 000.
The number of people in the Calgary area (to the nearest thousand) is 400 000.

Give the number of people (to the nearest thousand) in these areas.

A Winnipeg
B Quebec
C Toronto
D Vancouver
E Edmonton
F Montreal

*All population data are based on preliminary figures from the 1971 census, Statistics Canada.

5. A Which area has the greatest number of people?
   B Which area has the least number of people?

6. The areas are listed in alphabetical order. List them according to population. Place the name of the area with the most people at the top of your list.

7. Montreal has about 2 500 000 more people than Halifax, Nova Scotia. What is the population of Halifax ?

8. A Which areas have between 2 000 000 and 3 000 000 people ?
   B Which areas have between 500 000 and 600 000 people ?
   C Which areas have more than 450 000 and less than 500 000 people ?

9. Which area on the list has a population about 2 000 000 greater than the Ottawa-Hull area ?

10. A The province of Quebec has about 3 000 000 more people than the Montreal area. About how many people live in Quebec ?
    B The province of New Brunswick has about 400 000 fewer people than the Vancouver area. About what is the population of New Brunswick ?

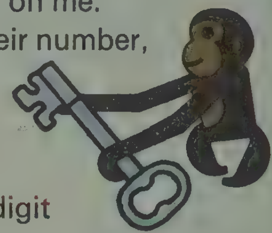
11. The population of Canada is about 19 000 000 more than the number of people living in the Montreal area. About what is the population of Canada ?

1. Write the correct numerals.
   - A 7 tens and 8
   - B 9 tens and 3
   - C 8 hundreds and 9 tens
   - D 4 thousands and 5
   - E 7 thousands and 4 tens

2. Give the missing numbers.
   - A One hundred is ▒ tens.
   - B One thousand is ▒ hundreds.
   - C One thousand is ▒ tens.
   - D ▒ thousands are 1 million.
   - E $99 + 1 = n$
   - F $999 + 1 = n$

think

When digits get together
They always count on me.
If you must find their number,
I really am the key.



WHO AM I?

Now I'm the only digit
Whose number stays the same
No matter where I am
In our place-value game.

WHO AM I?

3. Study the numeral. Then give the correct word for each blank.

$$\underbrace{4\,3\,6}_{\text{group 3}}\quad\underbrace{5\,0\,7}_{\text{group 2}}\quad\underbrace{2\,4\,6}_{\text{group 1}}$$

   The digits in group 1 tell how many ones.
   - A The digits in group 2 tell how many __?__.
   - B The digits in group 3 tell how many __?__.

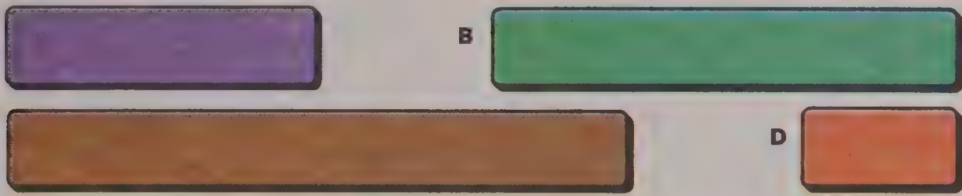
4. Write the sign (<, >) that should go in each ▒.
   - A 83 762 ▒ 84 672
   - B 342 968 ▒ 351 000
   - C 687 234 572 ▒ 687 243 572
   - D 999 999 ▒ 1 000 000

5. Give the number that is 1 000 000 more than
   - A 5 000 000.
   - B 23 560.
   - C 4862.
   - D 343 000 000.

6.
   - A Give the smallest 2-digit numeral that has 3 as a digit.
   - B Give the smallest 3-digit numeral that has the digits 1 and 9.
   - C Give the largest 4-digit numeral that has 9 as a digit in three places.

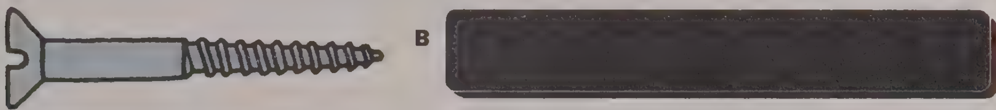
1. If the red strip  is the unit, what is the length of each strip below?

A B C D



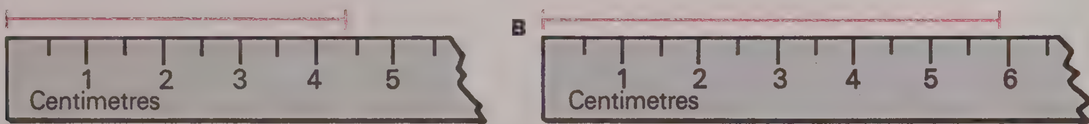
2. If the purple strip is the unit, give the lengths to the nearest unit.

A B



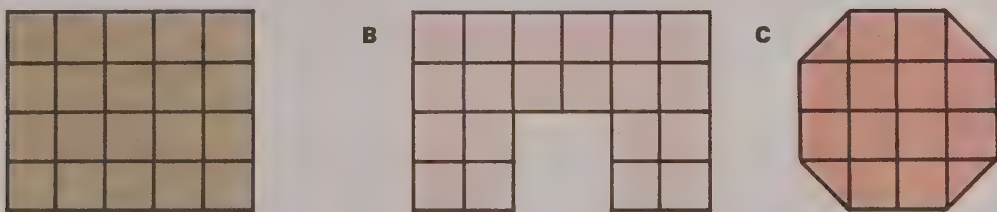
3. Give the length of each segment to the nearest centimetre.

A B



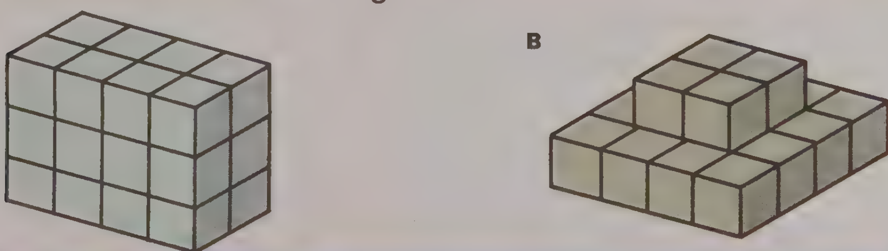
4. Find the area of each region. Each small square is a unit.

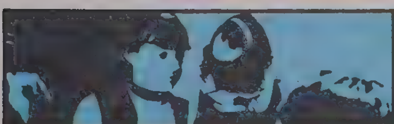
A B C



5. Give the volume of each figure.

A B





You are invited to explore

ACTIVITY CARD 1
Page 347

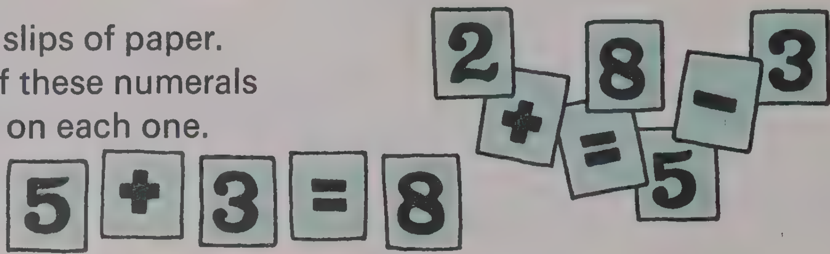
3

Addition and Subtraction

Are addition and subtraction related?

Investigating the Ideas

Cut out 7 slips of paper.
Put one of these numerals
and signs on each one.



? How many different equations can you "write" with your slips of paper?	Record each equation you find.

Discussing the Ideas

1. A How many of these ▲?
   B How many of these ■?
   C How many shapes in all?
   D Can you give two addition and two subtraction equations for these three numbers?

2. The Addends and Sum are marked in each equation. 4 is also called the difference of 7 and 3. Give the names for the numbers in the equations you found for exercise 1D.

$$\overset{A}{4} + \overset{A}{3} = \overset{S}{7}$$

$$\overset{S}{7} - \overset{A}{3} = \overset{A}{4}$$

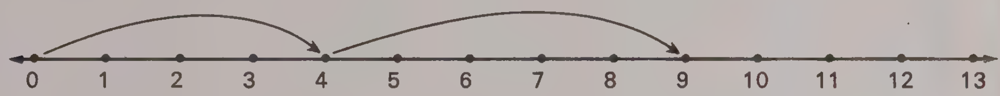
3. Find the missing addend and difference.

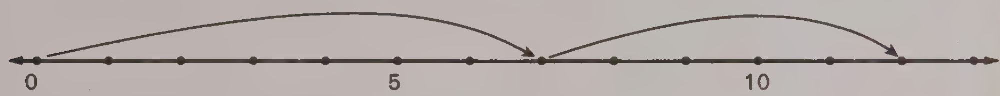
> You find this difference
>
> $n + 7 = 15$
>
> $15 - 7 = n$
>
> when you find this addend.

1. Find the differences by finding the missing addends.

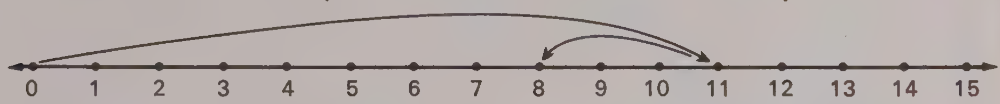
A $n + 5 = 9$ $9 - 5 = n$	E $n + 6 = 15$ $15 - 6 = n$	I $n + 7 = 16$ $16 - 7 = n$
B $n + 6 = 11$ $11 - 6 = n$	F $n + 8 = 17$ $17 - 8 = n$	J $n + 9 = 16$ $16 - 9 = n$
C $n + 8 = 13$ $13 - 8 = n$	G $n + 5 = 12$ $12 - 5 = n$	K $n + 8 = 14$ $14 - 8 = n$
D $n + 9 = 15$ $15 - 9 = n$	H $n + 9 = 18$ $18 - 9 = n$	L $n + 6 = 13$ $13 - 6 = n$

2. Write an addition equation for each number-line picture.

A


B


3. Write the subtraction equation for each number-line picture.

A


B

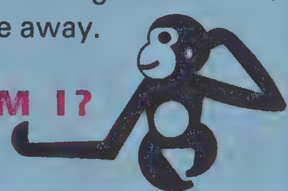

4. One exercise below has no whole-number answer. Find it. Then find the differences for the others.

A $14 - 8$ B $13 - 5$ C $14 - 6$

D $13 - 0$ E $7 - 9$ F $12 - 7$

think

When I'm the operation
You'll never go astray
If you find the missing addend
Or think of take away.

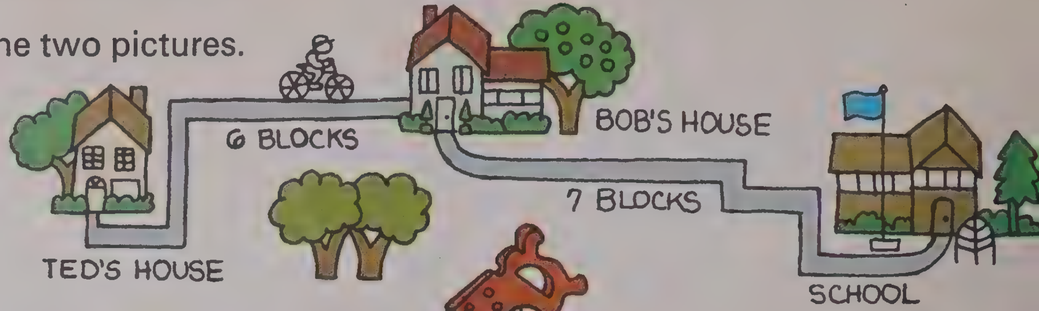


WHO AM I?

Investigating the Ideas

Look at the two pictures.

A



B

? Can you write and solve an addition problem for picture A and a subtraction problem for picture B ?

Discussing the Ideas

1. The numbers in these problems are missing. Explain how you would find the answers if the numbers were given.

   A Had |||| apples.
   Ate |||| of them.
   How many left ?

   B Had |||| cents.
   Earned |||| cents more.
   How much now ?

   C |||| boys. |||| girls.
   How many more boys than girls ?

   D Spent |||| cents.
   Have |||| cents left.
   Had how much to start ?

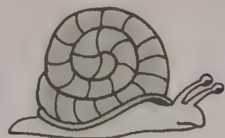
   E Won |||| games.
   Lost |||| games. No ties.
   Played how many games ?

   F Jim is |||| centimetres tall.
   Tom is |||| centimetres tall.
   How much taller is Jim ?

2. Make up a problem of your own. Can you solve your own problem ?

Short Story Problems

1 6 boys in the game. 8 boys on the bench. How many boys?



2 13 slow turtles. 7 slow snails. How many more turtles than snails?

3 16 papers. Delivered 7. How many more to be delivered?

4 Magician has 12 rabbits. 7 disappear. How many remain?

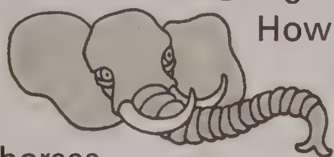
5 15 dogs. 7 tails. How many dogs have no tails?

6 6 hockey cards. Need 15 in all. How many more needed?

7 13 jungle elephants. 7 taken to the zoo. How many left?

8 9 girls with dolls. 5 girls without dolls. How many girls?

9 5 eggs. How many more needed to make a dozen?



10 16 cowboys. 9 horses. How many more cowboys than horses?

12 14 girls. 6 go home. How many left?

11 4 cows. 8 horses. How many animals?

13 17 chickens. 9 eggs. How many more chickens than eggs?

14 14 kites in the air. 9 boys each flying one kite. How many kites got away?

★15 17 airplanes on the ground. 9 flew away. 6 others landed. How many planes now on the ground?

More practice, page A-6, Set 10

Do you know your facts?

1. Find the missing numbers in the tables.

	Add 5	
	6	11
	9	14
A	8	
B	4	

	Add 8	
	2	10
C	6	
D	4	
E	9	

	Add 6	
	7	13
F	8	
G	3	
H	9	

	Add 9	
I	2	
J	5	
K	8	
L	7	

2. Copy each addition table and give the missing numbers.

A

+	3	5
7	10	12
6	9	

B

+	3	8
4	7	
9		

C

+	5	4
9		
8		

D

+	5	9
7		
6		

3. Find the sums and differences.

A	B	C	D	E	F	G
$8 + 5$	$10 - 7$	$16 - 8$	$11 - 8$	$2 + 8$	$13 - 7$	$12 - 9$

H	I	J	K	L	M	N
$15 - 8$	$7 + 9$	$15 - 7$	$11 - 3$	$13 - 5$	$2 + 7$	$11 - 4$

O	P	Q	R	S	T	U
$3 + 9$	$14 - 7$	$18 - 0$	$11 - 5$	$16 - 8$	$9 + 9$	$14 - 6$

4. Give the missing numbers.

	Addend	Addend	Sum
	5	8	13
A	7	4	
B	6		14
C		9	13
D		3	11
E	5		12

think

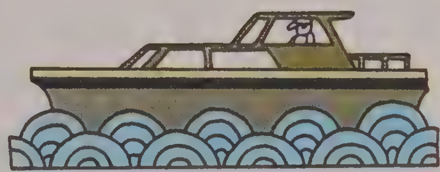
Walking on a Path
One girl in front of two girls.
One girl behind two girls.
One girl between two girls.
How many girls?

AT THE SERVICE STATION

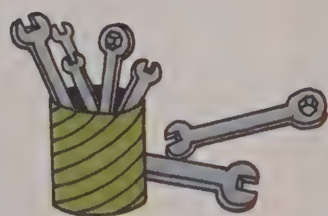
1. Mr. Blue greased 9 cars before lunch and 8 cars after lunch. How many cars did he grease ?

2. A gas tank on a sports car holds 47 litres when full. 8 litres have been put in. How many more are needed to fill the tank ?

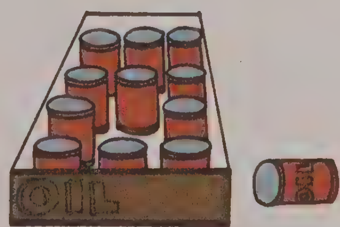
3. The gas tank on Mr. Brown's boat holds 54 litres. When 6 litres were put in, the tank was full. How many litres were already in the tank ?



4. Mr. Blue had a set of 7 wrenches. He bought a new set of 16 wrenches. How many more wrenches are in the new set than in the old ?



5. On Friday 5 tires were sold, and on Saturday 9 tires were sold. How many tires were sold on these two days ?



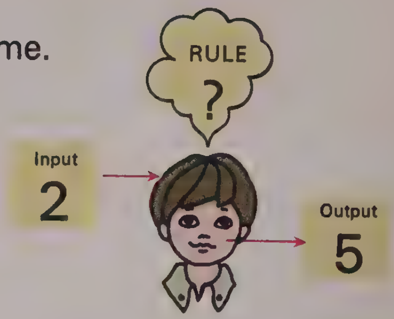
6. There are 12 cans of oil in a box. 7 cans are sold. How many cans are left ?

7. There are 16 cans of auto polish in a box. Some are sold. 9 cans are left. How many cans were sold ?

More practice, page A-7, Set 11

Investigating the Ideas

Kay and Paul were playing the function game.
When Kay said 2, Paul answered 5.
When Kay said 3, Paul answered 7.
When Kay said 5, Paul answered 11.



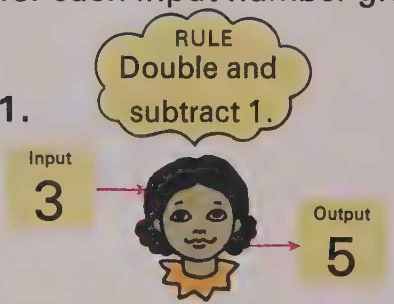
When Kay said 6, what do you think Paul answered?
What is Paul's rule?

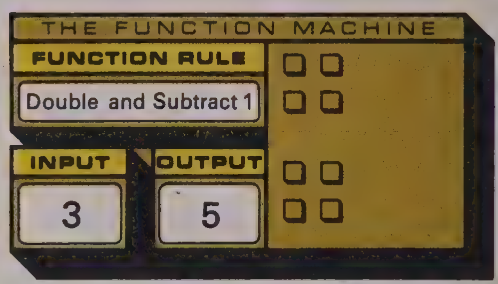
> **?** Can you invent a rule and play the function game with some of your classmates?

Discussing the Ideas

The function game helps you understand the **function machine.** Study the pictures to see how it works. Give the output number for each input number given.

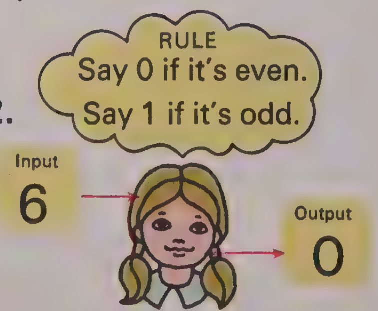
1.

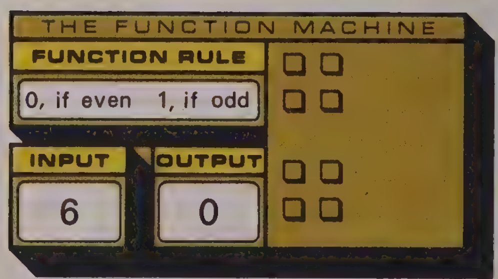




Input numbers → A 2 B 5 C 8 D 10 E 9

2.





Input numbers → A 2 B 4 C 5 D 37 E 100

Think about the function machine and tell what you think should go in each gray space.

1. Function Rule: Add 7

	Input	Output
	1	8
A	4	
B	7	
C	9	
D	5	

2. Function Rule: A

	Input	Output
	2	4
	3	6
	5	10
B	9	
C		8

3. Function Rule: A

	Input	Output
	16	8
	12	4
	8	0
B	13	
C	17	

4. Function Rule: A

	Input	Output
	10	1
	18	9
	12	3
B	16	
C		6

5. Function Rule: A

	Input	Output
	4	10
	7	13
B	9	
C		14
D	5	

6. Function Rule: A

	Input	Output
	10	5
	7	2
B	14	
C	5	
D		8

★ **7.** Function Rule: A

	Input	Output
	2	6
	5	12
	3	8
	9	20
B	7	

★ **8.** Function Rule: Add 7 if odd, Add 8 if even

	Input	Output
A	5	
B	6	
C	7	
D	8	
E	9	

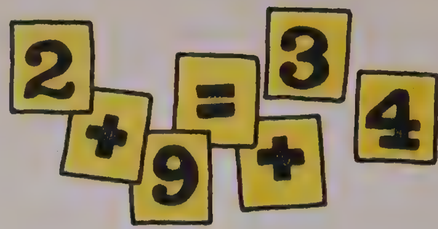
★ **9.** Function Rule: 7 or less: add 8, >7: subt. 8

	Input	Output
A	4	
B	15	
C	10	
D	7	
E	17	

What are the basic principles for addition?

Investigating the Ideas

Cut out 7 slips of paper.
Put one of these numerals or one of these signs on each one.



$$2 + 3 + 4 = 9$$

?	How many different equations with 3 addends can you "write" with your slips of paper?	Record each equation you find.

Discussing the Ideas

1. Solve these equations.
   A $5 + 3 = n$ B $3 + 5 = n$ C $6 + 4 = n$ D $4 + 6 = n$
2. Can you change the order of two addends and get the same sum?
3. Solve these equations. Add the shaded numbers first.
   A $(2 + 3) + 1 = n$
   $2 + (3 + 1) = n$
   B $2 + (5 + 4) = n$
   $(2 + 5) + 4 = n$
4. Can you change the grouping of addends and get the same sum?
5. When you add three or more numbers, can you **rearrange** them in any way you wish and get the same sum?
6. What is the result when you add zero to any number?
7. Explain each of these principles in your own words.
   Order principle Grouping principle
   Rearrangement principle Zero principle

1. Each exercise suggests an example of the order principle. Give the example.

A 

(Answer: 4 + 2 = 2 + 4)

B Start at 9. Count forward 4.
Start at 4. Count forward 9.

C Jump 3 metres. Then jump 4 metres.

Jump 4 metres. Then jump 3 metres.

2. In each exercise, the two sums are the same. To find the sum, use the grouping that is easier for you.

A (2 + 8) + 7
2 + (8 + 7)

B (9 + 7) + 3
9 + (7 + 3)

C (99 + 1) + 17
99 + (1 + 17)

3. For each part of exercises A and B, add the red numbers first. Then find the sum. Is each sum the same in A ? in B ?

A 3 + 4 + 5
3 + 4 + 5
3 + 4 + 5

B 2 + 5 + 4 + 6
2 + 5 + 4 + 6
2 + 5 + 4 + 6

4. Solve the equations.

A $9 + 0 = n$
B $0 + 56 = n$
C $0 + 99 = n$
D $784 + 0 = n$

5. Find the sums. Look for ten.

A 2 + 7 + 8
B 3 + 9 + 1
C 56 + 9 + 1
D 5 + 20 + 5
E 6 + 88 + 4
F 75 + 5 + 5

think

For each exercise, give the pair of numbers that should go in the gray spaces.

Sum ± Difference

	Sum				Difference
	15	9	±	6	3
	7	5	±	2	3
A	12		±		4
B	15		±		1
C	18		±		0
D	80		±		20

Discussing the Ideas

1. Which of these sums are "in the 70's"? Which of these sums are "in the 80's"?

76 + 2
76 + 3
76 + 4
76 + 5
76 + 6

2. Can you tell quickly, without actually finding the sum, which of the sums below are in the 70's and which are in the 80's?

$$\begin{array}{r}77\\+8\\\hline\end{array}\qquad\begin{array}{r}74\\+1\\\hline\end{array}\qquad\begin{array}{r}75\\+9\\\hline\end{array}\qquad\begin{array}{r}79\\+2\\\hline\end{array}\qquad\begin{array}{r}72\\+6\\\hline\end{array}\qquad\begin{array}{r}76\\+3\\\hline\end{array}\qquad\begin{array}{r}78\\+3\\\hline\end{array}$$

3. Solve and explain each equation.
   - A Since $8 + 4 = 12$, we know $8 + 14 = n$.
   - B Since $9 + 5 = 14$, we know $9 + 25 = n$.
   - C Since $7 + 6 = 13$, we know $7 + 56 = n$.

4. Explain each step in the example below.

Step 1	Step 2
$\begin{array}{r}{\scriptstyle 1}\\58\\+\,36\\\hline 4\end{array}$	$\begin{array}{r}{\scriptstyle 1}\\58\\+\,36\\\hline 94\end{array}$
$8 + 6 = 14$	$10 + 50 + 30 = 90$

1. Find the sums.

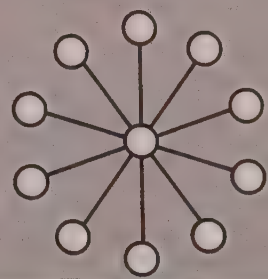
A 55 + 34	B 27 + 60	C 63 + 25	D 51 + 76	E 34 + 85	F 63 + 54
G 45 + 79	H 88 + 66	I 63 + 49	J 74 + 58	K 85 + 67	L 96 + 76
M 91 + 19	N 34 + 87	O 43 + 99	P 55 + 88	Q 56 + 89	R 99 + 89

2. Find the sums.

A 11, 23, + 35	B 67, 20, + 31	C 72, 31, + 34
D 42, 20, + 86	E 30, 19, + 24	F 26, 37, + 12
G 37, 16, + 28	H 28, 27, + 26	I 67, 27, + 58

think

On your paper, draw a figure like the one below. Place the numbers 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 in the circles so the sum along any line is 21.



3. Solve the equations.

A $54 + 37 + 28 + 9 = n$

B $4 + 17 + 36 + 8 = n$

C $n = 76 + 58 + 29 + 7$

D $n = 64 + 9 + 78 + 8$

E $n = 85 + 9 + 7 + 39$

F $76 + 84 + 7 + 3 = n$

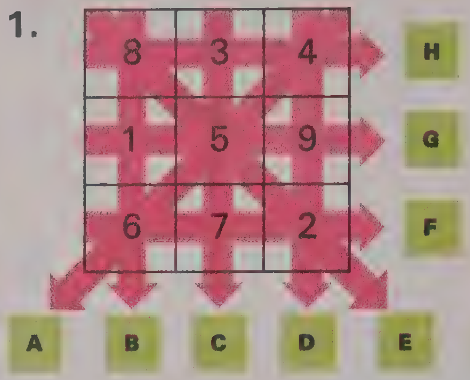
4. Copy each problem. Give the missing digit for each ▥.

A 4▥ + ▥5 = 77	B ▥▥ + 45 = 128	C 5▥ + 35 = 94	★ D ▥7 + 4▥ = 111	★ E 56 + ▥▥ = 145	★ F 7▥ + ▥7 = 143

More practice, page A-7, Set 12

Investigating the Ideas

1.



Find the sums A through H to see why this is a MAGIC SQUARE.

2.

3	8	1
2	3	7
7	1	4

? Can you write a sentence that tells why 2 is not a MAGIC SQUARE?

Discussing the Ideas

1. Copy this figure. Add 2 to each number in the magic square above and put the sums in the same positions in your square.
   A Do you still have a magic square?
   B What is the "magic sum"?

2. Find the sum along the colored arrow.
   A What is the magic sum?
   B Can you find A, B, and C so this will be a magic square?

4	9	A
3	B	7
8	1	C

1. A What is the magic sum?
   B Find numbers for A, B, and C that make this a magic square.

5	B	C
6	6	6
A	4	7

2. Copy and complete each square to make it a magic square.

A

6		6
	7	7
8		8

B

5		
13	8	
6		11

C

4	8	9
	7	

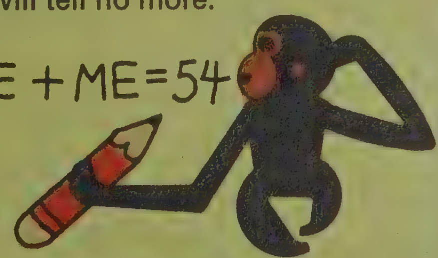
★ 3. See if you can find the missing numbers that will make this a magic square.

18		5	
7	13	12	
11	9		14
6		17	3

think

Add me to myself.
You'll get fifty-four.
That should be enough.
I will tell no more.

ME + ME = 54



WHO AM I?

Discussing the Ideas

1. You can use what you know about adding 2-digit numbers to help you add 3-digit numbers. Study the example. Give the missing digits.

Adding ones	Adding tens	Adding hundreds
Step 1 1 5 6 4 + 3 8 9 ▯	Step 2 1 1 5 6 4 + 3 8 9 ▯ 3	Step 3 1 1 5 6 4 + 3 8 9 ▯ 5 3

Try these.

A 528 + 235

B 785 + 368

2. Copy the example and give the missing digits.

Adding ones	Adding tens	Adding hundreds
Step 1 2 2 3 6 3 5 8 + 2 8 9 ▯	Step 2 1 2 2 3 6 3 5 8 + 2 8 9 ▯ ▯	Step 3 1 2 3 6 3 5 8 + 2 8 9 ▯ ▯ ▯

Try these.

A 399 + 730 + 854

B 425 + 693 + 747

3. Here is a way you might find sums mentally. Study the steps carefully.

Step 1	Step 2
5 8 + 3 4 6 2	5 8 + 3 4 6 2 9 2 ← sum
58 + 4 = 62 →	62 + 30 = 92

Try these.

A 27 + 35

B 56 + 35

C 47 + 69

D 68 + 57

E 466 + 58

F 946 + 75

1. Find the sums.

A 637 +245	B 152 +439	C 627 +368	D 384 +463	E 490 +268
F 307 +892	G 626 +184	H 939 +384	I 785 +368	J 897 +106
K 378 +956	L 625 +785	M 413 +589	N 652 +73	O 92 +658

2. Find the sums.

A 1789 +7047	B 3346 +2478	C 1567 +9687	D 2027 +8596	E 21,234 +36,897

3. Find the sums.

A 243 572 +146	B 568 57 +223	C 68 322 +417	D 635 444 +511	E 428 35 +6
F 465 874 +956	G 526 204 +789	H 456 383 +49	I 7764 6752 +8568	J 3993 7306 +8541

4. Solve the equations.

A $632 + 75 + 8 = n$
B $68 + 232 + 40 = n$
C $n = 9 + 6 + 34 + 346$
D $n = 876 + 345 + 23$
E $693 + 27 + 8 = n$
F $87 + 9 + 658 = n$
G $n = 658 + 26 + 37 + 9$
H $759 + 88 + 54 + 8 = n$

think

Place 10 coins (or other discs) in a triangular shape.

Move only 3 coins and get

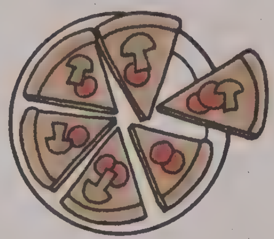
More practice, page A-8, Set 13

How many calories are in the food you eat?

Investigating the Ideas

The food we eat gives us energy to work and play and keep our bodies warm. Some foods give us more energy than others.

Foods which supply more calories give us more energy. Nine- or ten-year-old girls and boys need about 2000 calories each day.



All the pizza you can eat

Your breakfast

All your meals in one day

? Can you find the number of calories you would get from each of the examples above or from a meal you choose?

Discussing the Ideas

1. Which activity do you think uses more calories?

running

reading

2. Who should eat more?

business man

football player

3. It takes 7700 "extra" (above what you need) calories to gain one kilogram. How many "extra" milkshakes (500 calories each) would you need to gain one kilogram?

Jack made a chart to show his supply of calories for one day. Use his chart to answer these questions.

Calorie Chart

	NUMBER OF CALORIES
BREAKFAST	
Juice	85
Cereal	95
Strawberries	43
½ cup milk	85
Sugar	15
LUNCH	
Ham and Cheese sandwich	395
Lettuce Salad	48
Baked Beans	147
Apple	75
Milk, 1 glass	166
DINNER	
Round Steak	235
Hash Brown Potatoes	197
Peas and Carrots	60
Bread and Butter	157
Pumpkin Pie	198
Milk, 1 glass	166
SNACK	
Milk, 1 glass	166
2 Soda Crackers	45

1. How many calories did Jack get from
   A his breakfast?
   B his lunch?
   C his dinner?

2. How many calories did Jack get in all?

3. How many calories did Jack get from milk and juice?

4. How many calories did Jack get from the sandwich and the pie?

5. Jack made this chart of his calories for one week.
   A How many calories did Jack get during the 5 days of the school week?
   B How many calories did he get on the weekend?
   C What was Jack's total calorie supply for the week?

SUN.	2607
MON.	2454
TUES.	2213
WEDS.	2378
THURS.	2185
FRI.	2732
SAT.	2578

★ 6. Jack needs 2000 calories a day to maintain his weight. If he gets about the same number of calories each week as in exercise 5, how many weeks does it take Jack to gain 1 kilogram? (Remember 7700 "extra" calories are needed to gain 1 kilogram.)

Investigating the Ideas

Suppose you have five dollars to spend on two of these gifts.

? Can you list the different pairs of gifts you could buy?

Discussing the Ideas

Explain how you can use these sums to give answers to these short money problems.

$$\begin{array}{r} 324 \\ +599 \\ \hline 923 \end{array} \qquad \begin{array}{r} 922 \\ 324 \\ +607 \\ \hline 1853 \end{array} \qquad \begin{array}{r} 514 \\ +869 \\ \hline 1383 \end{array}$$

1. Had $3.24.
   Collected $5.99.
   Have how much now?

2. Electricity . . . $9.22
   Water $3.24
   Telephone . . . $6.07
   How much for all three?

3. Meat $5.14
   Other groceries . . $8.69
   How much in all?

Planning a Camping Trip

Carol's family is getting ready for a camping trip. Here is a list of some of the things they might need and the cost of each item.

CAMPING SUPPLIES	
Aluminum cook set	\$ 8.69
Knife-axe set	\$ 4.97
Flashing lantern	\$ 9.49
Camp stove	\$21.94
Air mattress	\$ 7.67
Sleeping bag	\$18.98
Tent	\$98.50
Campground guidebook	\$ 2.17
Canteen set	\$ 3.84
Hunting knife	\$ 4.27

1. Carol used part of her money to buy an air mattress and a campground guide book. How much did she spend?

2. Kent wants to earn enough money to buy a sleeping bag and a hunting knife. How much must he earn?

3. What is the total cost of the tent and the camp stove?

4. Alan has \$11. How much more does he need to buy a flashing lantern and a knife-axe set?

5. A Each of the five members of the family bought a canteen set. What was the total cost?
   B Would they have paid more or less if they had bought two aluminum cook sets instead of the five canteen sets? How much more or less?

★ 6. Find the total cost of all the equipment listed.

Investigating the Ideas

A sequence is a list of numbers. Some sequences have a pattern. Can you find a pattern and give the next four numbers for each of these sequences?

A 1, 7, 13, 19, ▢, ▢, ▢, ▢, . . .

B 2, 4, 8, 16, ▢, ▢, ▢, ▢, . . .

C 1, 2, 3, 5, 8, ▢, ▢, ▢, ▢, . . .

> **?** Can you make up a sequence of your own and see if one of your classmates can find your pattern?

Discussing the Ideas

1. Explain the pattern for sequence A.
2. Do you think the twentieth number in sequence B will be as large as 10 000? List as many numbers as you need to find out.
3. Can you explain how this diagram explains the pattern for sequence C?

   1, 2, 3, 5, 8, ▢, ▢, . . .

   A Guess how many more numbers you would need to list in this sequence before you reached a number larger than 1000.
   B List the numbers in the sequence until you reach a number larger than 1000.

1. Give the next four numbers in each sequence.
   - A 5, 10, 15, 20, . . .
   - B 2, 4, 6, 8, . . .
   - C 1, 0, 2, 0, 3, 0, . . .
   - D 1, 3, 5, 7, . . .
   - E 10, 100, 1000, . . .
   - F 12, 23, 34, 45,. . .
   - G 1, 34, 67, 100, . . .
   - H 3, 1, 1, 6, 1, 1, 9, 1, 1, . . .

think

Suppose 3 squirrels can eat 3 nuts in 3 minutes. At that rate, how long will it take 100 squirrels to eat 100 nuts?

2. Here are the first 10 numbers in the sequence of odd numbers.

   1 3 5 7 9 11 13 15 17 19

   Pick any four of the numbers in order (like 3, 5, 7, 9) and add them as shown in this diagram.

   Are the inner and outer sums the same for any four odd numbers in a row? Try three more examples.

   outer sum, 3 + 9 = 12

   3, 5, 7, 9

   inner sum, 5 + 7 = 12

★ 3. Sometimes the pattern of a sequence is hard to find. Can you find these patterns?
   - A 4, 3, 2, 8, 7, 6, 12, 11, . . .
   - B 5, 5, 10, 15, 25, . . .
   - C 1, 3, 6, 10, 15, 21, . . .
   - D 1, 2, 6, 16, 44, . . .

Keeping in Touch with Addition, Place value, Inequalities

1. Solve the equations.

A $287 = 200 + 80 + n$

B $456 = 400 + n + 6$

C $981 = n + 80 + 1$

D $342 = 300 + n + 2$

E $780 = 700 + 80 + n$

F $604 = 600 + n + 4$

2. Write the numeral for

A three thousand two hundred thirty-five.

B fifty-six thousand, fifty-four.

C fifty-six thousand, two hundred fifty-four.

D nine hundred thirty-six thousand, one hundred one.

E nine hundred fifty thousand, twelve.

F four million, twenty-three thousand, forty-two.

G thirty-nine million, one hundred seventy-eight.

3. Write each of the following numbers as in the example.

Example: $4386 = 4000 + 300 + 80 + 6$

A 56

B 342

C 783

D 5287

E 6043

F 28 642

G 75 480

H 628 492

4. In the numeral 43 682 the 3 stands for 3000. Give the number for each colored digit below.

A 34 682

B 34 682

C 34 682

D 34 682

E 6 284 563

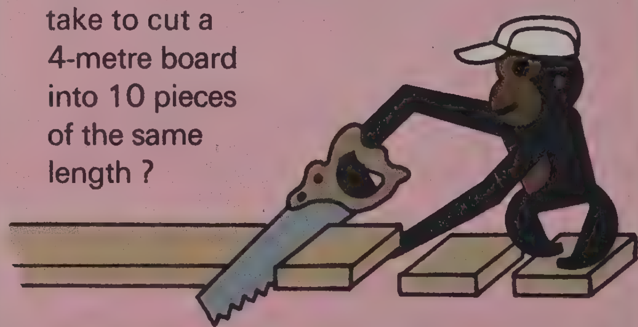
F 6 284 563

G 6 284 563

H 6 284 563

think

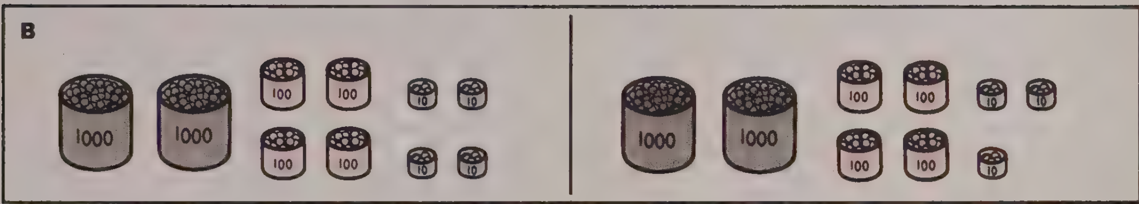
If it takes 2 minutes to make each cut, how long will it take to cut a 4-metre board into 10 pieces of the same length ?



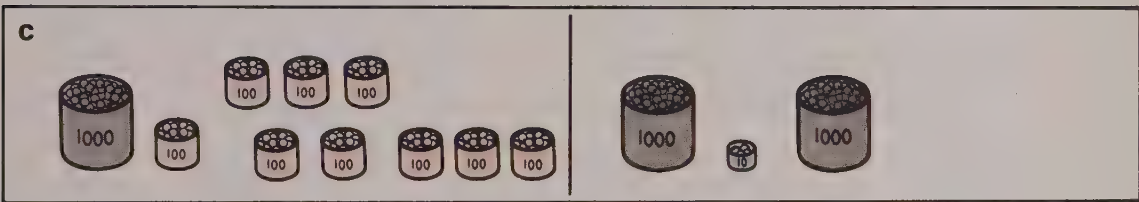
5. The number of beads in each can is labelled on the can. Which set, left or right, contains more beads ?

A

B



C



6. In each exercise, give the sign < or > for the . Then give the words (greater than or less than) for the blank.

A 286 276
286 is __?__ 276.

B 304 296
304 is __?__ 296.

C 5279 5280
5279 is __?__ 5280.

D 6848 6792
6848 is __?__ 6792.

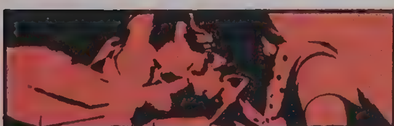
E 8267 4983
8267 is __?__ 4983.

F 8663 8636
8663 is __?__ 8636.

G 9528 7643
9528 is __?__ 7643.

H 25 367 25 267
25 367 is __?__ 25 267.

I 83 000 82 999
83 000 is __?__ 82 999.



You are invited to explore

ACTIVITY CARD 2
Page 348

How does regrouping help you subtract?

Discussing the Ideas

Regrouping →
$$\begin{array}{r} 75 \\ -\,29 \\ \hline \end{array} \rightarrow \begin{array}{r} 70 \\ -\,20 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ -\,9 \\ \hline ? \end{array} \rightarrow \begin{array}{r} 60 \\ -\,20 \\ \hline 40 \end{array} \quad \begin{array}{r} 15 \\ -\,9 \\ \hline 6 \end{array} \rightarrow \begin{array}{r} 75 \\ -\,29 \\ \hline 46 \end{array}$$

Shortcut →
$$\begin{array}{r} 7\;5 \\ -\,2\;9 \\ \hline \end{array} \qquad \begin{array}{r} 7\;5 \\ -\,2\;9 \\ \hline 4\;6 \end{array}$$

1. Find this difference by using both the regrouping method and the shortcut.
$$\begin{array}{r} 6\;5 \\ -\,3\;8 \\ \hline \end{array}$$

2. Explain each step for finding this difference. →
$$\begin{array}{r} 5\;3\;2 \\ -\,1\;6\;3 \\ \hline \end{array}$$

$$\begin{array}{r} 500 \\ -\,100 \\ \hline \end{array} \quad \begin{array}{r} 30 \\ -\,60 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ -\,3 \\ \hline \end{array} \rightarrow \begin{array}{r} 500 \\ -\,100 \\ \hline \end{array} \quad \begin{array}{r} 20 \\ -\,60 \\ \hline \end{array} \quad \begin{array}{r} 12 \\ -\,3 \\ \hline \end{array} \rightarrow \begin{array}{r} 400 \\ -\,100 \\ \hline \end{array} \quad \begin{array}{r} 120 \\ -\,60 \\ \hline \end{array} \quad \begin{array}{r} 12 \\ -\,3 \\ \hline \end{array}$$

Can you use this method to find this difference? →
$$\begin{array}{r} 9\;6\;1 \\ -\,4\;7\;8 \\ \hline \end{array}$$

3. Study the example below.

$$\begin{array}{r} \\ 6\;3\;4 \\ -\,3\;7\;8 \\ \hline \end{array} \qquad \begin{array}{r} {\scriptstyle 2\;14} \\ 6\;\cancel{3}\;\cancel{4} \\ -\,3\;7\;8 \\ \hline 6 \end{array} \qquad \begin{array}{r} {\scriptstyle 5\;12\;14} \\ \cancel{6}\;\cancel{3}\;\cancel{4} \\ -\,3\;7\;8 \\ \hline 5\;6 \end{array} \qquad \begin{array}{r} {\scriptstyle 5\;12\;14} \\ \cancel{6}\;\cancel{3}\;\cancel{4} \\ -\,3\;7\;8 \\ \hline 2\;5\;6 \end{array}$$

Can you find this difference by using the shortcut above?
$$\begin{array}{r} 7\;2\;6 \\ -\,2\;5\;9 \\ \hline \end{array}$$

1. Find the differences.

A 76 − 68	B 135 − 57	C 154 − 96	D 183 − 28	E 174 − 96	F 135 − 48
G 124 − 97	H 157 − 68	I 194 − 99	J 173 − 69	K 176 − 89	L 191 − 97

2. Find the differences.

A 762 − 425	B 847 − 363	C 934 − 568	D 654 − 257	E 820 − 316	F 717 − 209
G 438 − 59	H 564 − 209	I 713 − 307	J 876 − 497	K 521 − 475	L 923 − 854
M 863 − 429	N 562 − 367	O 674 − 289	P 1246 − 753	Q 1342 − 658	R 1437 − 619

3. Make up subtraction problems so that when you cover the ones' digits, they look like these.

A

$$\begin{array}{r} 8 \\ -3 \\ \hline 5 \end{array}$$

B

$$\begin{array}{r} 6 \\ -2 \\ \hline 3 \end{array}$$

4. One digit is covered. Is the difference

$$\begin{array}{r} 5\square \\ -29 \\ \hline \end{array}$$

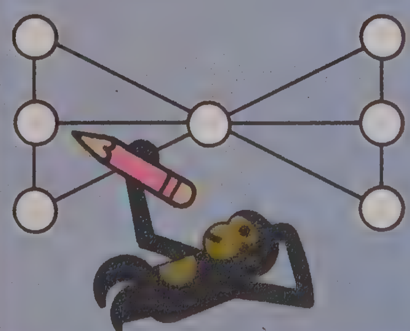
A less than 20?

B 30 or less?

C between 30 and 40?

think

Draw a figure like the one below. Put the digits 2, 3, 4, 5, 6, 7, and 8 in the circles so the sum along any line is 15.



More practice, page A-9, Set 14

Improving subtraction skills

1. Find the differences.

A $\begin{array}{r} 56 \\ -19 \\ \hline \end{array}$	B $\begin{array}{r} 85 \\ -23 \\ \hline \end{array}$	C $\begin{array}{r} 43 \\ -19 \\ \hline \end{array}$	D $\begin{array}{r} 74 \\ -24 \\ \hline \end{array}$	E $\begin{array}{r} 75 \\ -58 \\ \hline \end{array}$	F $\begin{array}{r} 66 \\ -49 \\ \hline \end{array}$
G $\begin{array}{r} 524 \\ -519 \\ \hline \end{array}$	H $\begin{array}{r} 425 \\ -208 \\ \hline \end{array}$	I $\begin{array}{r} 230 \\ -150 \\ \hline \end{array}$	J $\begin{array}{r} 964 \\ -787 \\ \hline \end{array}$	K $\begin{array}{r} 787 \\ -499 \\ \hline \end{array}$	L $\begin{array}{r} 455 \\ -277 \\ \hline \end{array}$
M $\begin{array}{r} 631 \\ -356 \\ \hline \end{array}$	N $\begin{array}{r} 715 \\ -538 \\ \hline \end{array}$	O $\begin{array}{r} 376 \\ -189 \\ \hline \end{array}$	P $\begin{array}{r} 1428 \\ -619 \\ \hline \end{array}$	Q $\begin{array}{r} 1536 \\ -657 \\ \hline \end{array}$	R $\begin{array}{r} 1847 \\ -588 \\ \hline \end{array}$

2. Find the differences.

A $\begin{array}{r} 1543 \\ -1369 \\ \hline \end{array}$	B $\begin{array}{r} 2173 \\ -1478 \\ \hline \end{array}$	C $\begin{array}{r} 1467 \\ -873 \\ \hline \end{array}$	D $\begin{array}{r} 3424 \\ -1945 \\ \hline \end{array}$	E $\begin{array}{r} 6531 \\ -3874 \\ \hline \end{array}$
F $\begin{array}{r} 98\,752 \\ -75\,176 \\ \hline \end{array}$	G $\begin{array}{r} 86\,345 \\ -38\,751 \\ \hline \end{array}$	H $\begin{array}{r} 97\,683 \\ -69\,794 \\ \hline \end{array}$	I $\begin{array}{r} 83\,745 \\ -51\,876 \\ \hline \end{array}$	

3. Solve the equations.

A $34 - 29 = n$	D $565 - 27 = n$	G $732 - 727 = n$
B $156 - 48 = n$	E $654 - 646 = n$	H $854 - 8 = n$
C $347 - 9 = n$	F $1548 - 538 = n$	I $923 - 19 = n$

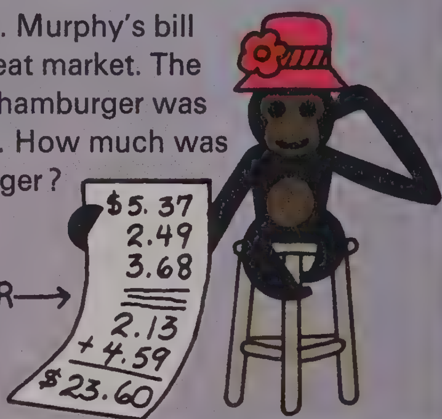
★ **4.** Copy the problems. Give the missing digit for each ▥.

A $\begin{array}{r} ▥▥▥ \\ -264 \\ \hline 274 \end{array}$	B $\begin{array}{r} 8▥3 \\ -▥48 \\ \hline 50▥ \end{array}$
C $\begin{array}{r} ▥73 \\ -1▥▥ \\ \hline 348 \end{array}$	D $\begin{array}{r} 727 \\ -▥▥▥ \\ \hline 260 \end{array}$
E $\begin{array}{r} 9▥3 \\ -488 \\ \hline ▥0▥ \end{array}$	F $\begin{array}{r} 58▥ \\ -2▥6 \\ \hline ▥82 \end{array}$

think

Here is Mrs. Murphy's bill from the meat market. The cost of the hamburger was marked out. How much was the hamburger?

HAMBURGER



THE HUMAN SKELETON

The head	Number of bones
Cranium	8
Face	14
Ears	6
Hyoid in neck	1
The trunk	
Spinal column	26
Ribs	24
Breastbone	1
Collar bones	2
Shoulder bones	2
Pelvic bones	2
The limbs	
Arms	60
Legs	60

1. How many bones are in the head?
2. How many bones are in the trunk?
3. How many more bones does the trunk have than the head?
4. Each arm has 30 bones. The hand and wrist contain all but three of these. How many bones are in the hand and wrist?
5. Each leg has 30 bones. The ankle and foot have 26 of these. How many bones are in the rest of the leg?
6. Each of 12 bones in the spinal column has two ribs attached to it. How many bones in the spinal column do not have ribs attached?
7. How many bones are in the human body?

SCIENCE

1 Telescope made by Galileo in 1609. Mt. Palomar's reflector telescope built 1948. How many years later?

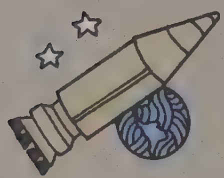
2 Thomas Edison. Born, 1847. Died, 1931. How long did he live?

3 Edison invented the electric light bulb, 1879. How old was he then?

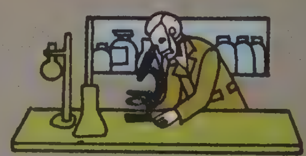
4 Albert Einstein. Born, 1879. Died, 1955. How long did he live?

5 Electricity generated from atomic energy, 1951. How old was Einstein then?

6 Compound microscope. Invented by Janssen in 1590. How many years ago was this?



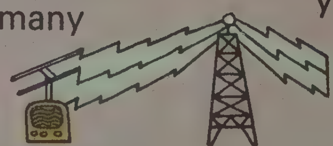
7 Chinese rockets invented about 1232. First liquid-fuel rocket launched, 1926. How many years later?



8 Artificial satellites suggested by Sir Isaac Newton, 1689. First manned satellite into orbit, 1961. How many years later?

9 Louis Pasteur prevented diseases by vaccination, 1881. Polio vaccine developed by Jonas Salk, 1953. How many years later?

10 First adding machine invented by Pascal, 1642. How many years ago?



11 Electromagnetic waves studied by James Maxwell in 1864. Some results: radio, television, radar, lasers. About how many decades ago did Maxwell study these waves?

HISTORY

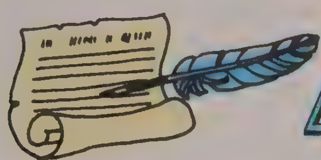
1 America. Discovered in 1492. How many years ago?

2 Quebec. Founded by Champlain in 1608. How many years ago?

3 Pilgrims. Landed at Plymouth, Massachusetts, in 1620.

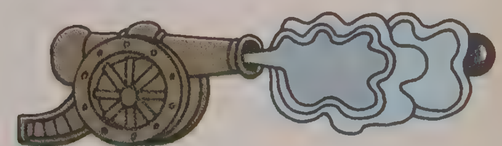
A How many years ago?

B How many years after the founding of Quebec?



4 British North America Act. Signed, 1867. How many years ago?

5 Sir John A. Macdonald, Prime Minister of Canada, 1867-1873, 1878-1891. How many years?



6 Quebec captured, 1759. How many years ago?

7 World War I, 1914. How many years after the capture of Quebec?

8 World War II, 1939. How many years ago?

9 Fortress of Louisbourg. Built by French in 1720. Captured by New Englanders in 1745. How many years did the French hold the fortress?

10 Lester Pearson. Born, 1897. Died, 1972. How long did he live?

11 Gold discovered in Klondike, 1896. How many years ago?

12 Albert Schweitzer. Born, 1875. Nobel Peace Prize, 1952. How old was he then?

13 MacKenzie reached Pacific, 1793. How many years was this after the discovery of America?

More practice, page A-9, Set 15

Let's explore regrouping for subtraction again.

Discussing the Ideas

1. Explain the following statements.
   - A For 805, we can think 8 hundreds, 0 tens, and 5.
   - B For 805, we also can think 80 tens and 5.

2. Complete each sentence.
   - A For 206, we can think ▥ tens and 6.
     For 206, we also can think 19 tens and ▥.
   - B For 507, we can think ▥ tens and 7.
     For 507, we also can think 49 tens and ▥.
   - C For 7004, we can think ▥ tens and 4.
     For 7004, we also can think 699 tens and ▥.
   - D For 9002, we can think ▥ tens and 2.
     For 9002, we also can think 899 tens and ▥.

3. In Step 2 below, we first think of 507 as 50 tens and 7. Explain the regrouping.

Step 1	Step 2	Step 3
$\begin{array}{r} 5\ 0\ 7 \\ -\ 2\ 4\ 9 \\ \hline \end{array}$	$\begin{array}{r} \overset{4}{\cancel{5}}\ \overset{9}{\cancel{0}}\ \overset{17}{\cancel{7}} \\ -\ 2\ 4\ 9 \\ \hline \end{array}$	$\begin{array}{r} \overset{4}{\cancel{5}}\ \overset{9}{\cancel{0}}\ \overset{17}{\cancel{7}} \\ -\ 2\ 4\ 9 \\ \hline 2\ 5\ 8 \end{array}$ (c) (b) (a)
There is no whole-number answer.	507: 49 tens and 17	(a) $17-9=8$ (b) $90-40=50$ (c) $400-200=200$

4. Explain each part of Step 3 above.

5. Can you find these differences?
   - A $\begin{array}{r} 506 \\ -\ 358 \\ \hline \end{array}$
   - B $\begin{array}{r} 403 \\ -\ 156 \\ \hline \end{array}$

6. Copy and complete this problem.

$$\begin{array}{r} \overset{7}{\cancel{8}}\ \overset{9}{\cancel{0}}\ \overset{9}{\cancel{0}}\ \overset{14}{\cancel{4}} \\ -\ 4\ 3\ 7\ 8 \\ \hline \end{array}$$

1. Give the missing numbers.

A For 306, we can think ▥ tens and 6.
B For 306, we can think 29 tens and ▥.
C For 704, we can think ▥ tens and 4.
D For 704, we can think 69 tens and ▥.
E For 6007, we can think ▥ tens and 7.
F For 6007, we can think 599 tens and ▥.
G For 6025, we can think ▥ hundreds and 25.
H For 6025, we can think 59 hundreds and ▥.

2. Copy and complete each subtraction exercise.

A $\begin{array}{r} {\scriptstyle 1\ 9\ 14} \\ \cancel{204} \\ -126 \\ \hline \end{array}$ B $\begin{array}{r} {\scriptstyle 4\ 9\ 12} \\ \cancel{502} \\ -247 \\ \hline \end{array}$ C $\begin{array}{r} {\scriptstyle 3\ 9\ 9\ 12} \\ \cancel{4002} \\ -1275 \\ \hline \end{array}$ D $\begin{array}{r} {\scriptstyle 7\ 9\ 14} \\ \cancel{8047} \\ -1562 \\ \hline \end{array}$ E $\begin{array}{r} {\scriptstyle 6\ 4\ 9\ 13} \\ \cancel{6503} \\ -1345 \\ \hline \end{array}$

3. Find the differences. Check your answers by adding.

A $\begin{array}{r} 602 \\ -38 \\ \hline \end{array}$ B $\begin{array}{r} 706 \\ -87 \\ \hline \end{array}$ C $\begin{array}{r} 406 \\ -298 \\ \hline \end{array}$ D $\begin{array}{r} 1507 \\ -348 \\ \hline \end{array}$ E $\begin{array}{r} 700 \\ -389 \\ \hline \end{array}$

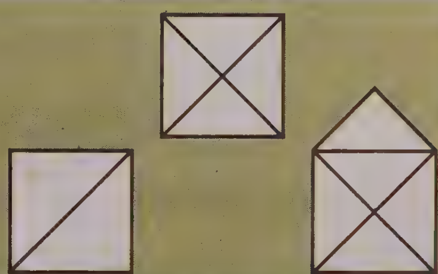
F $\begin{array}{r} 534 \\ -125 \\ \hline \end{array}$ G $\begin{array}{r} 607 \\ -437 \\ \hline \end{array}$ H $\begin{array}{r} 832 \\ -564 \\ \hline \end{array}$ I $\begin{array}{r} 6004 \\ -2386 \\ \hline \end{array}$ J $\begin{array}{r} 4300 \\ -2643 \\ \hline \end{array}$

★ **4.** Copy the problems. Give the missing digit for each ▥.

A $\begin{array}{r} 679 \\ -\text{▥▥▥} \\ \hline 374 \end{array}$ B $\begin{array}{r} \text{▥▥▥} \\ -595 \\ \hline 5 \end{array}$ C $\begin{array}{r} 1\text{▥}0\text{▥} \\ -8\text{▥}5 \\ \hline 702 \end{array}$ D $\begin{array}{r} \text{▥▥▥}5 \\ -57 \\ \hline 948 \end{array}$

think

Try to draw each figure without lifting your pencil from the paper and without retracing. Two of them **can** be done. One of them **cannot.**



Let's practice adding and subtracting.

1. Find the sums and differences.

A	B	C	D	E	F
567 +839	843 −456	705 −239	618 +496	583 +819	900 −347

G	H	I	J	K	L
608 −439	874 −567	767 +869	409 +786	676 −186	501 −403

M	N	O	P	Q	R
871 623 489 376 +554	304 122 304 169 +785	652 374 418 920 +513	364 905 845 367 +978	768 858 979 659 +675	896 784 599 867 +657

S	T	U	V
5076 −3489	6785 +8432	70 043 −46 528	8403 −7685

W	X	Y	Z
17 954 +98 767	8006 −4875	16 934 +8 657	35 007 −3 879

2. Find the totals as in the example.

Example:
5 h 40 min
3 h 30 min
8 h 70 min
or 9 h 10 min

A	B
6 h 35 min 4 h 35 min	2 wk 5 days 3 wk 6 days

C	D
20 min 53 s 30 min 12 s	3 h 50 min 4 h 30 min

3. Find the differences as in the example.

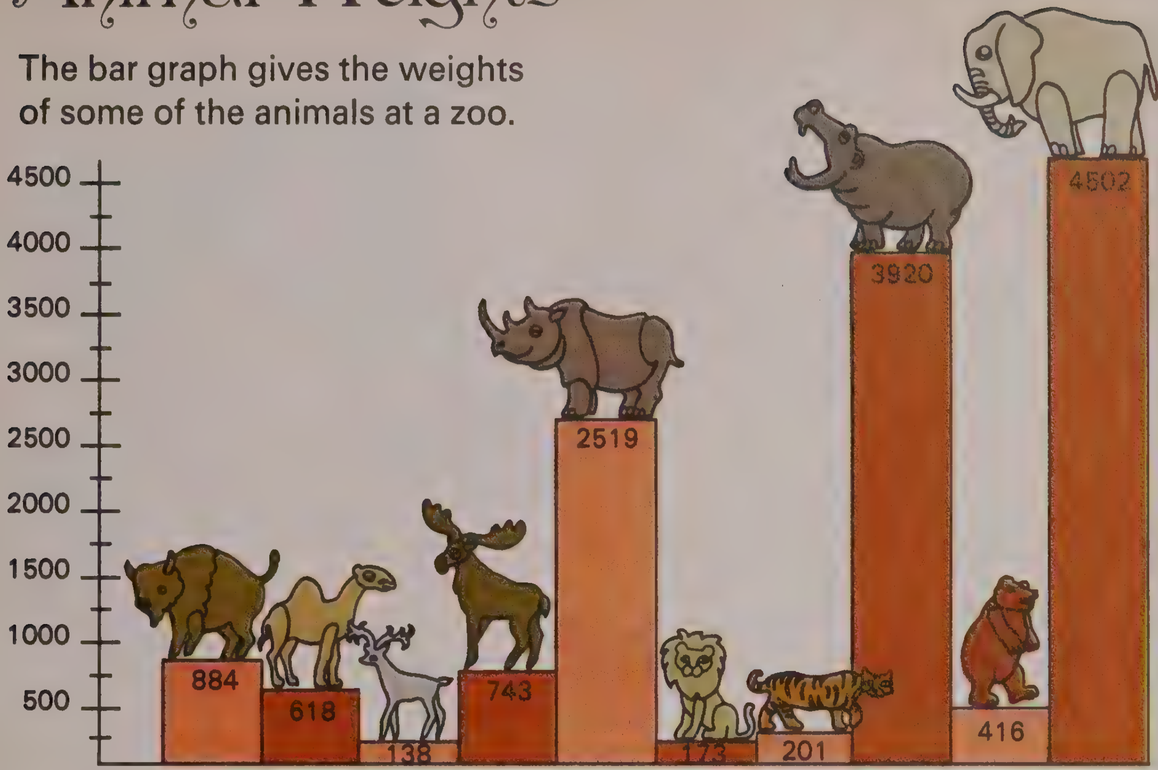
Example:
3 h 10 min → 2 h 70 min
1 h 50 min → 1 h 50 min
1 h 20 min

A	C
6 days 7 h 1 day 13 h	7 min 14 s 6 min 52 s

B	D
5 h 30 min 2 h 45 min	10 wk 2 days 3 wk 5 days

Animal Weights

The bar graph gives the weights of some of the animals at a zoo.



1. How many kilograms must the lion gain to weigh as much as the tiger ?
2. The rhinoceros lost 350 kilograms. How much did it weigh then ?
3. Find the total weight of the two heaviest animals.
4. Find the total weight of the three lightest animals.
5. Find the difference in the weights of the two heaviest animals.
6. If a buffalo and a camel were weighed on the scales together what would the scales read then ?
7. How much more does the buffalo weigh than the bear ?

★ 8. Some animals were on the scales. The scales read 2585 kilograms. The moose got on the scales and the bear got off. What did the scales then read ?

★ 9. A medium-sized car weighs 2164 kilograms. What is the difference in the weight of the elephant and the weight of two cars ?

Investigating the Ideas

Suppose you have $20 to spend. Choose three items you could buy from a newspaper advertisement.

? Can you find the total cost and the change you would get from $20?

Discussing the Ideas

1. Susan and Sara went shopping with their mother and father. Sara had $9.45. She wanted to buy a book which cost $2.97. She started to figure how much she would have left.

$$\begin{array}{r} \scriptstyle 3\ 15 \\ \$9.\cancel{4}\cancel{5} \\ 2.97 \\ \hline 8 \end{array}$$

   A Explain what Sara has done so far.
   B Tell how Sara should finish the problem.
   C Susan had $10. How much change would she get if she bought the book?

2. Eric bought a game for 63 cents. As the clerk returned change from $1.00, he said, "63 cents."

   "Here is 64, 65, 70, 75, one dollar."

   Can you tell what coins Eric got as change?

1. Find the total amounts.

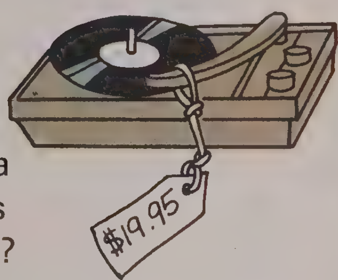
A	B	C	D	E
\$5.25	\$7.98	\$15.95	\$2.49	\$ .89
3.90	6.50	6.75	3.20	1.56
			6.98	.28

2. Find the differences in the amounts.

A	B	C	D	E
\$3.98	\$1.00	\$5.00	\$10.00	\$20.00
1.25	.79	3.95	6.50	15.50

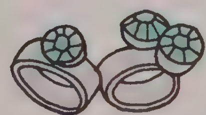
3. Susan saw these roller skates and ice skates. Which cost more? How much more?

4. Maria is saving her money to buy a record player. She has saved \$7.89. How much more must she save?

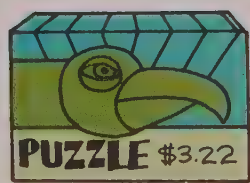


5. Eric bought a book about flowers for \$2.97, a book about horses for \$1.47, and a children's dictionary for \$3.73. What was the total cost?

6. Jean saw a birthstone ring that cost \$6.49. She saw a double birthstone ring that cost \$8.95. How much more did the double birthstone ring cost than the single birthstone ring?



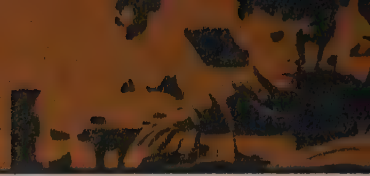
7. Bob and Alan each bought a game to give to friends.
- **A** Which game cost more?
- **B** How much more?



8. Linda's father gave the clerk \$40 for a bicycle that cost \$37.97. How much change did he receive?

More practice, page A-10, Set 17

Reviewing the Ideas



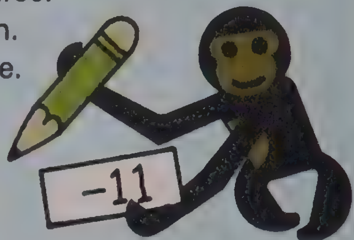
1. Find the differences by finding the missing addends.
   - A $n + 49 = 52$
     $52 - 49 = n$
   - B $n + 28 = 32$
     $32 - 28 = n$
   - C $n + 357 = 362$
     $362 - 357 = n$
   - D $n + 4349 = 4361$
     $4361 - 4349 = n$

think

Start with seven thousand.
Add four hundred three.
Then subtract eleven.
This will give you me.

$\boxed{7000}$

$\boxed{+403}$

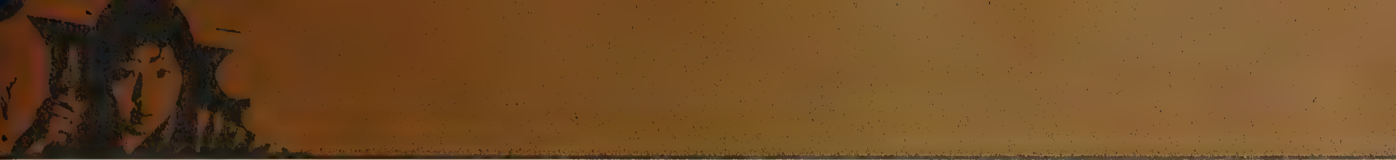


WHO AM I?

2. Find the sums and differences.

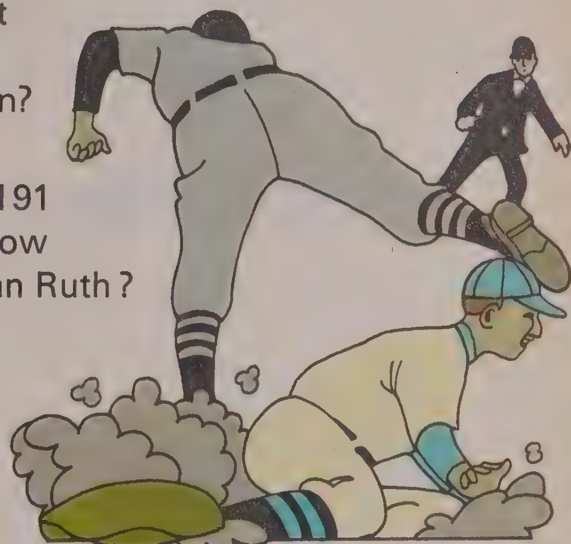
A $\begin{array}{r} 36 \\ +25 \\ \hline \end{array}$	B $\begin{array}{r} 53 \\ -26 \\ \hline \end{array}$	C $\begin{array}{r} 60 \\ -37 \\ \hline \end{array}$	D $\begin{array}{r} 97 \\ +68 \\ \hline \end{array}$	E $\begin{array}{r} 79 \\ +87 \\ \hline \end{array}$	F $\begin{array}{r} 87 \\ -79 \\ \hline \end{array}$
G $\begin{array}{r} 326 \\ +497 \\ \hline \end{array}$	H $\begin{array}{r} 547 \\ -293 \\ \hline \end{array}$	I $\begin{array}{r} 603 \\ -329 \\ \hline \end{array}$	J $\begin{array}{r} 700 \\ -287 \\ \hline \end{array}$	K $\begin{array}{r} 754 \\ +869 \\ \hline \end{array}$	L $\begin{array}{r} 1565 \\ +978 \\ \hline \end{array}$
M $\begin{array}{r} 8046 \\ -3779 \\ \hline \end{array}$	N $\begin{array}{r} 5008 \\ +6053 \\ \hline \end{array}$	O $\begin{array}{r} 9002 \\ -5437 \\ \hline \end{array}$	P $\begin{array}{r} 5037 \\ -2649 \\ \hline \end{array}$	Q $\begin{array}{r} 8703 \\ -5827 \\ \hline \end{array}$	
R $\begin{array}{r} 67 \\ 85 \\ +49 \\ \hline \end{array}$	S $\begin{array}{r} 385 \\ 277 \\ +969 \\ \hline \end{array}$	T $\begin{array}{r} 243 \\ 166 \\ +437 \\ \hline \end{array}$	U $\begin{array}{r} 5471 \\ 2364 \\ +6575 \\ \hline \end{array}$	V $\begin{array}{r} 56\,732 \\ 85\,968 \\ +97\,879 \\ \hline \end{array}$	

3. Copy each problem on your paper. Then find the sum.
   - A $356 + 49 + 8 + 6$
   - B $57 + 476 + 387 + 8$
   - C $5439 + 367 + 28$
   - D $395 + 2007 + 66$
   - E $6975 + 3428 + 26$
   - F $875 + 15\,693 + 78$
   - G $9 + 892 + 3467 + 12$
   - H $54\,937 + 6843 + 58$



4. Solve these problems about baseball batting records.

A One of the longest home runs on record was hit by Babe Ruth. The ball went 177 metres. If the longest baseball throw was 134 metres, how much longer was the home run?



B Ty Cobb had a lifetime record of 4191 hits. Babe Ruth made 2873 hits. How many more hits did Cobb make than Ruth?

C Babe Ruth hit 714 home runs during his major-league play. He also hit 506 doubles and 136 triples. How many extra-base hits did Babe Ruth make?

5. Give the sign (<, >, =) that should go in each ▥.

A $57 + 34$ ▥ $54 + 37$
B $532 + 256$ ▥ $256 + 532$
C $633 + 45$ ▥ $533 + 55$
D $857 + 384$ ▥ $867 + 374$
E $8324 + 637$ ▥ $8224 + 647$
F $8007 - 678$ ▥ $8007 - 578$
G $3967 - 1888$ ▥ $3867 - 1888$
H $6595 + 2387$ ▥ $6387 + 2595$

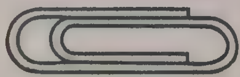
★ 6. For each exercise, tell how much more the first sum or difference is than the second sum or difference.

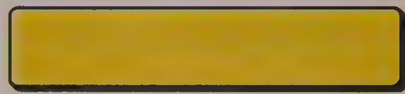
A $376 + 423$, $276 + 123$
B $658 + 49$, $638 + 59$
C $865 + 378$, $875 + 358$
D $593 + 476$, $493 + 366$
E $847 + 599$, $647 + 699$
F $603 - 37$, $503 - 37$
G $7004 - 295$, $7004 - 395$
H $876 - 498$, $776 - 598$
I $738 - 299$, $538 - 199$
J $993 - 489$, $793 - 499$

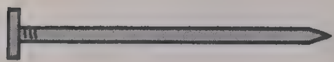
Keeping in Touch with

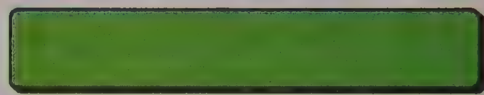
Measurement
Place value
Inequalities
Addition
Subtraction

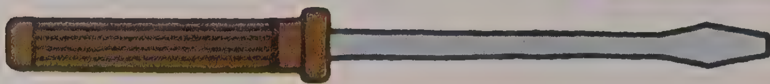
1. Find the length of each object to the nearest centimetre.

A


B


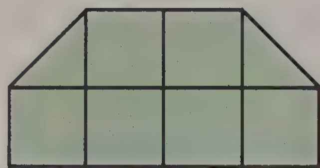
C


D


E


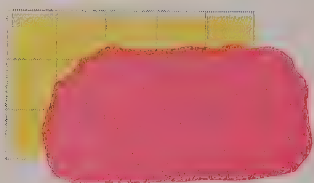
2. Give the area of each region. Each small square is a square centimetre.

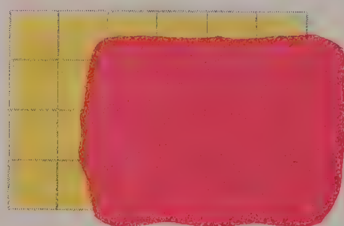
A


B


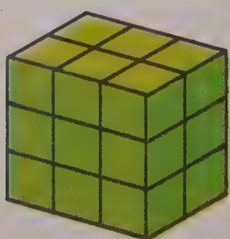
3. Find the perimeter of the region in 2A in centimetres.

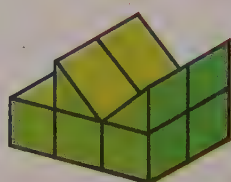
4. Find the area of each rectangle. Each small square is the unit.

A


B


5. Give the volume of each figure.

A


B


6. Find the sums and differences.

A $4 + 7 = n$ C $16 - 9 = n$ E $15 - 6 = n$ G $6 + 8 = n$

B $17 - 8 = n$ D $7 + 8 = n$ F $7 + 9 = n$ H $14 - 9 = n$

7. Write the numeral for
   - A 6 tens and 9.
   - B 2 hundreds, 5 tens, and 4.
   - C 7 thousands and 2.
   - D 9 thousands, 7 hundreds, 8 tens, and 6.

8. Solve the equations.

A $437 = 400 + 30 + n$ C $952 = n + 50 + 2$

B $786 = 700 + n + 6$ D $168 = n + 60 + 8$

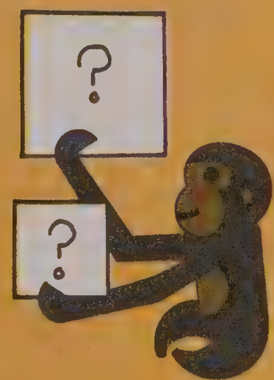
9. Write the sign ($>$ or $<$) that should go in each .
   - A 17 482 17 842
   - B 20 317 20 371
   - C 439 901 439 001
   - D 746 811 746 810

10. Give the number that is 100 000 more than

A 56 432. C 300 000.

B 7183. D 1 000 000.

think



I am a special square because the number for my area is the same as my perimeter number.

WHAT SQUARE AM I?

You are invited to explore

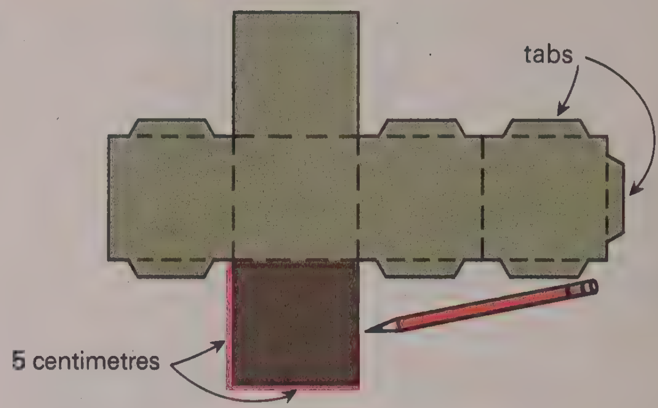
ACTIVITY CARD 3
Page 348

4 Geometry

Let's construct a cube.

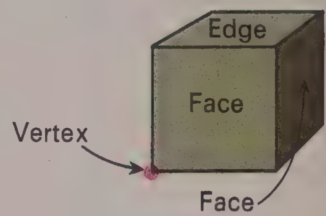
Investigating the Ideas

Use a 5-cm cardboard square to help you draw a pattern like this on heavy paper.

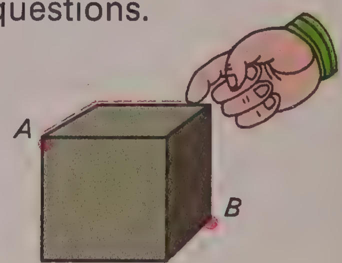


? Can you cut out your pattern and fold it to make a cube? Use paste or tape to stick the tabs in place.

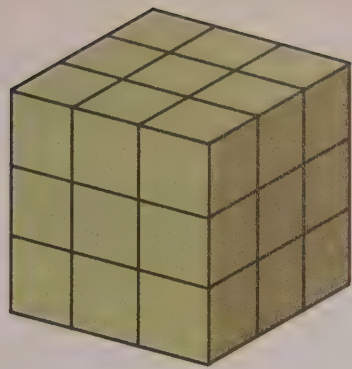
Discussing the Ideas



1. How many **faces** does your cube have?
2. How many **edges** does your cube have?
3. How many **vertices** (corners) does your cube have?
4. Use your cube to help you answer these questions.
   - A What is the smallest number of edges you can move your finger along to get from *A* to *B*?
   - B What is the greatest number of edges you can move along to get from *A* to *B* if you never go along the same edge twice?
   - C Can you get from *A* to *B* by going along 4 different edges?
   - D Can you get from *A* to *B* by going along 5 different edges?



1. Each student in a class made a cube. Then they stacked their cubes together like this to form one large cube.



   A How many cubes in each layer?
   B How many layers?
   C How many students in the class?

2. If you could not pick up the stack, how many of the cubes could you **not** see at all?

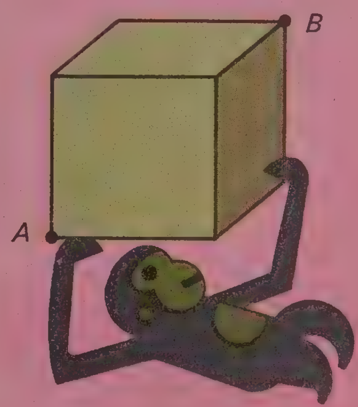
3. If you could pick up the stack and look at all sides, how many of the cubes could you **not** see at all?

★ 4. A What is the area of each face of your cube in square centimetres?
   B What is the total area of **all** the faces?

★ 5. What is the volume of your cube in cubic centimetres?

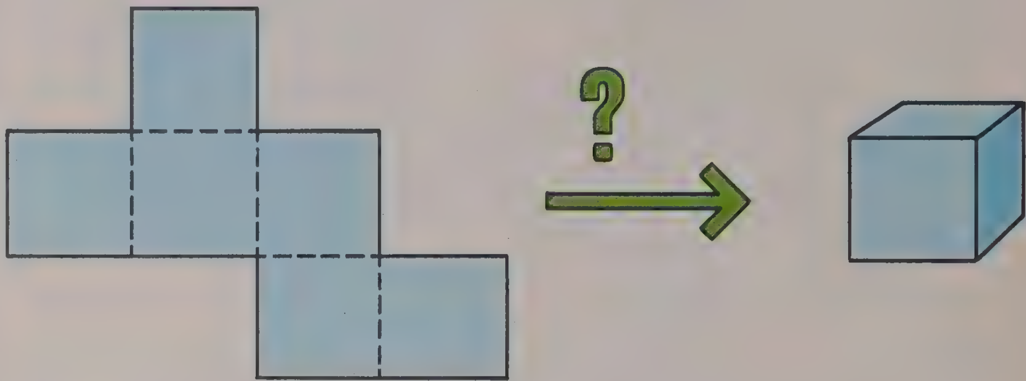
think

Can you find a shorter path from *A* to *B* than one along the edges?



Investigating the Ideas

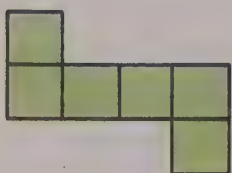
Make a large pattern of this figure and cut it out.



Can you fold this pattern to make a cube?

Discussing the Ideas

1. Select at least one of these patterns and use it to make a cube.

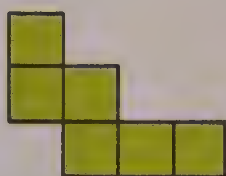
A


B


C


2. Can you find which one of these patterns will not form a cube?

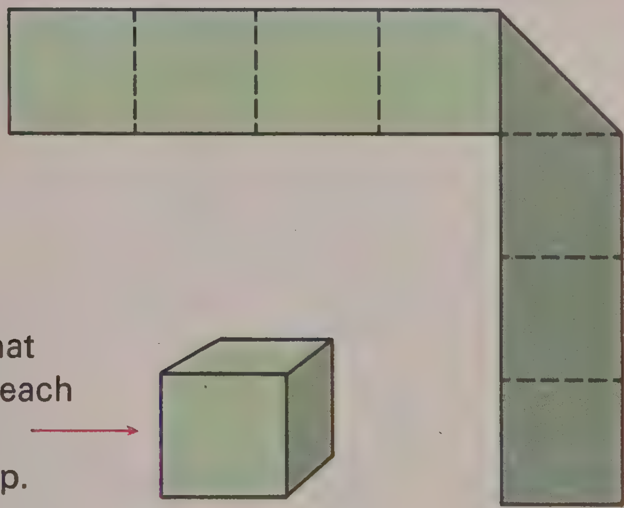
A


B


C


1. A Make a pattern like the one below and cut it out.

B Now fold the strip as in the figure.

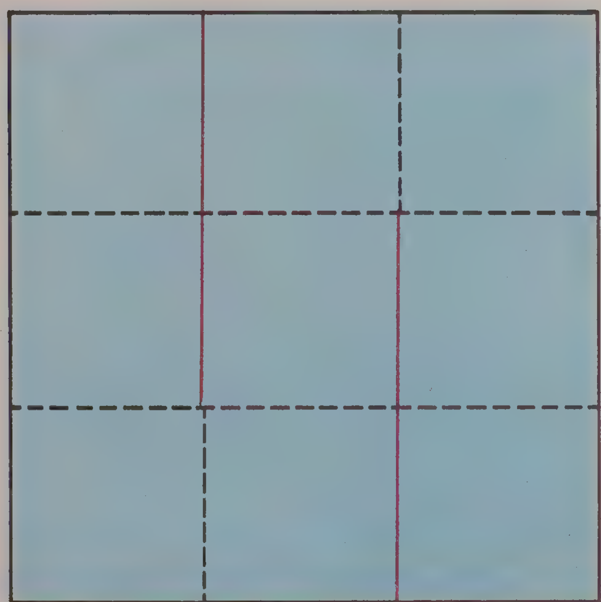


C Continue folding so that you have a cube with each face the size of one of the squares on the strip.

★ 2. Trace the square. Color the interior of the square. Cut along the solid red lines.

A Folding only along dashed lines, make a cube.

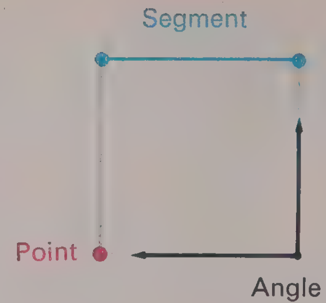
B Folding only along dashed lines, make a cube that has all its faces colored.



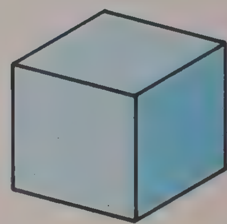
What are some simple figures on a cube?

Investigating the Ideas

A **square** suggests
- 4 points
- 4 angles
- 4 segments

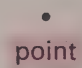


? How many points, angles, and segments can you locate on your cube?

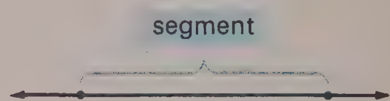


Discussing the Ideas

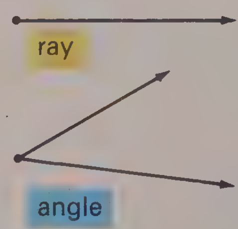
1. You can think of a **point** as a location. What are some things around your room that remind you of points?



2. You can think of a **segment** as a certain "part of a line." (The line does not end.) Name some things in your room that remind you of segments.

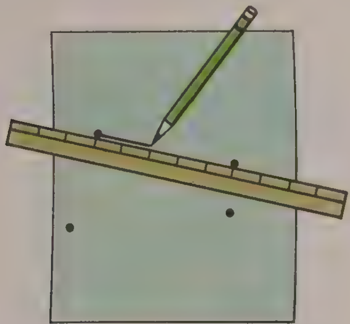


3. You can think of a **ray** as a certain "part of a line." An **angle** is 2 rays from one point. The angles of the square and cube are **right angles.** Are there things in your room that remind you of right angles?



4. Can you find some angles that are not right angles?

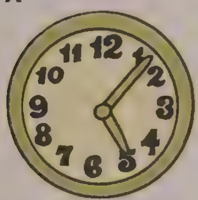
1. Mark 4 points on your paper. Use them to draw as many segments as you can.



2. Some angles are more "open" than others. Draw three "different-looking" angles.

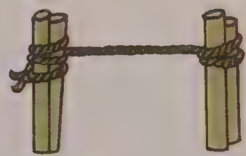
3. Tell what part of each picture reminds you of points, segments, or angles.

A

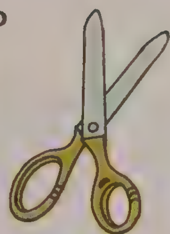


B

C



D



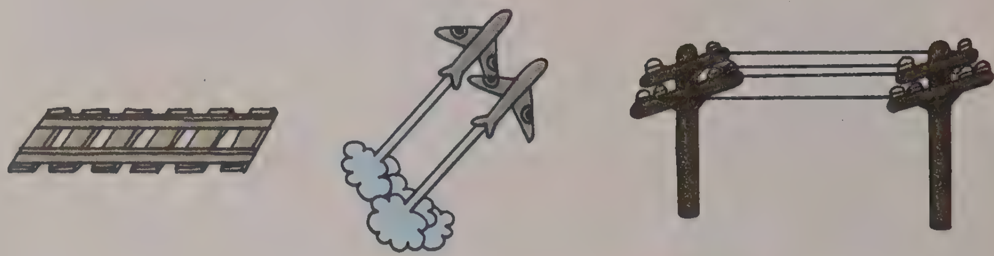
★ 4. Study the chart. Then draw and name a figure of each type.

We see	We label some points	We write	We say
	R S	$\overleftrightarrow{RS}$	"line *RS*"
	X Y	$\overrightarrow{XY}$	"ray *XY*"
	A B	$\overline{AB}$	"segment *AB*"
	F E G	$\angle EFG$	"angle *EFG*"

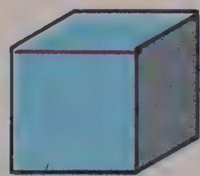
When are two lines or segments parallel?

Investigating the Ideas

These pictures suggest **parallel lines.**



Your cube has some parallel edges (segments). Color one edge of your cube.

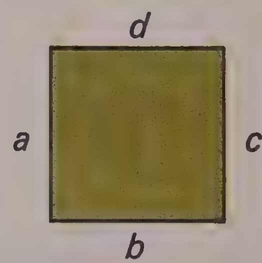


> How many segments on your cube are parallel to the colored segment? How many are not?

Discussing the Ideas

1. Can you find some things in your room that remind you of parallel lines or segments?

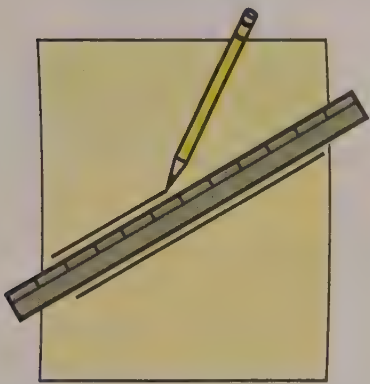
2. The sides of the square are marked *a, b, c,* and *d*. Which pairs of sides are parallel to each other?



3. Why do you think this figure is called a parallelogram? Do you think a square should be called a parallelogram?

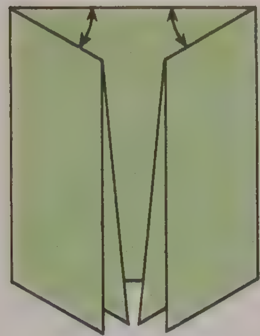
1. The two pictures suggest ways you might make parallel lines. Draw some parallel lines by using each method.

Using a ruler



Folding paper

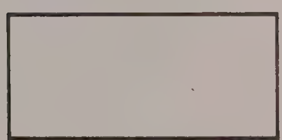
These edges must come together



Can you find a method of your own for drawing parallel lines?

2. Use parallel lines to help you draw a parallelogram and a rectangle.

Parallelogram



Rectangle

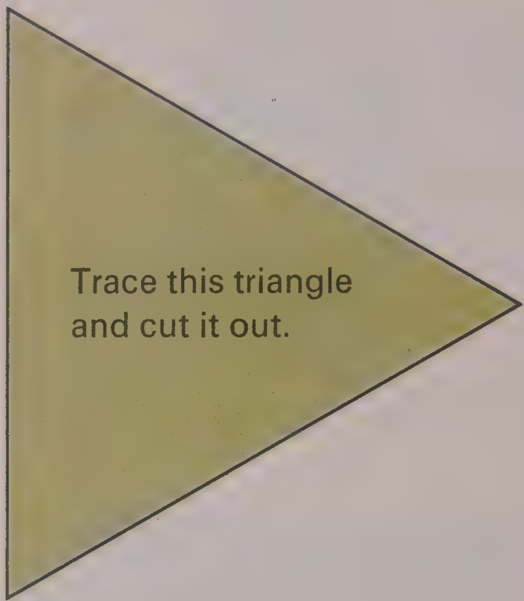
3. A rhombus is a parallelogram with all sides the same length. Can you use your ruler to draw a rhombus?

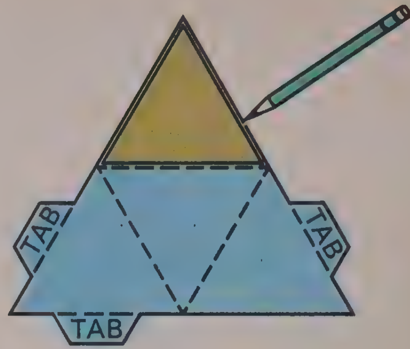
think

This is almost a magic square. You can "repair" it by exchanging the positions of two numbers. The magic sum is 15.

9	3	4
1	5	8
6	7	2

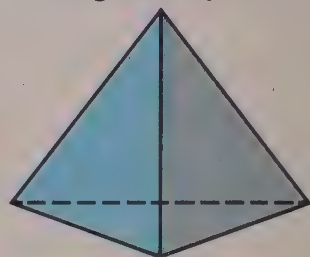
Investigating the Ideas





Use your triangle "cut-out" four times to draw this pattern on heavy paper. Cut out your pattern on the solid lines. You may want to add the tabs shown.

Triangular Pyramid



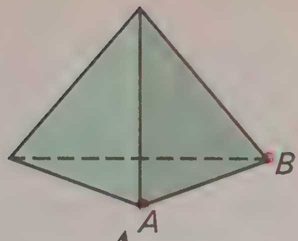
? Can you fold your pattern to make a triangular pyramid?

Discussing the Ideas

1. Give the missing words.
   - A Each **face** of your pyramid has the shape of a __?__.
   - B Each **edge** of your pyramid reminds you of a __?__.
   - C Each **vertex** of your pyramid reminds you of a __?__.

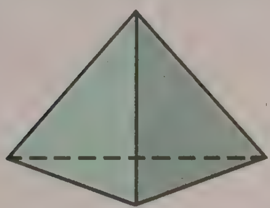
2. Which do you think has the greater volume, your cube or your pyramid?

1. A How many faces does the triangular pyramid have?
   B How many edges does it have?
   C How many vertices does it have?

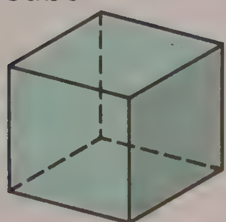


2. Use your triangular pyramid to answer these questions.
   A What is the smallest number of edges you can move along to get from *A* to *B*?
   B What is the greatest number of edges you can move along to get from *A* to *B* if you never go along the same edge twice?

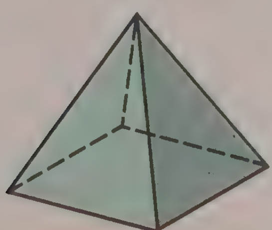
3. For each figure below, add the number of vertices to the number of faces. Then subtract the number of edges. What is your answer each time?
   A triangular pyramid



   B cube



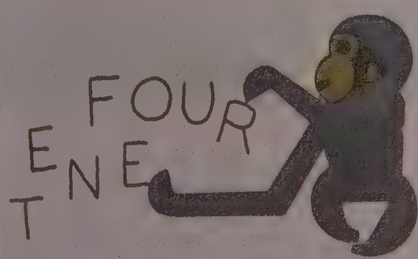
   C pyramid with one square face



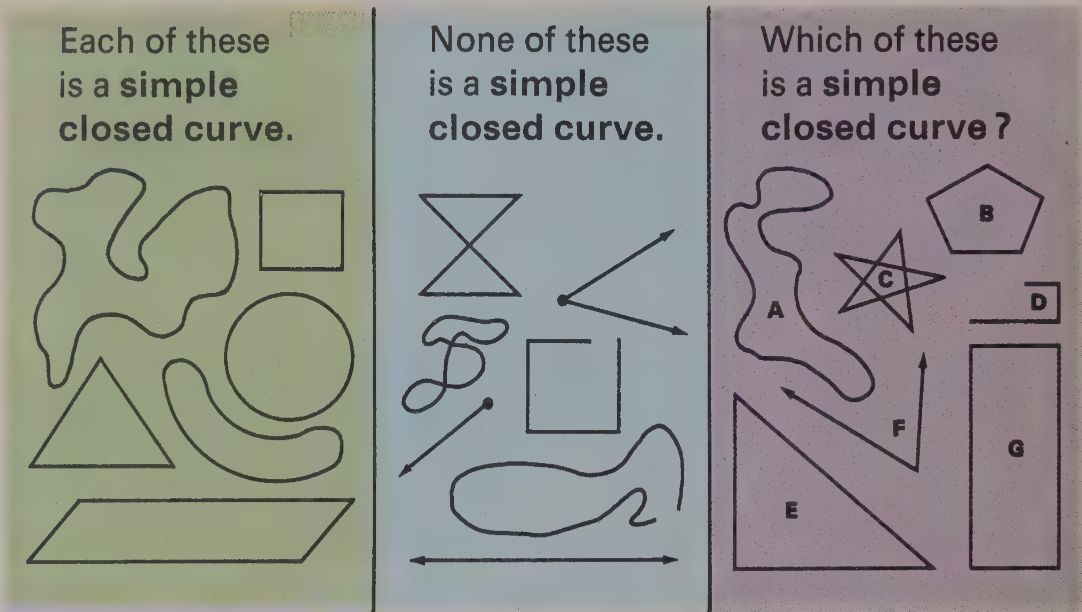
think

Can you unscramble these number words?

1. N E T
2. N E S E V
3. V E E E L N
4. T I N N N E E E



Investigating the Ideas

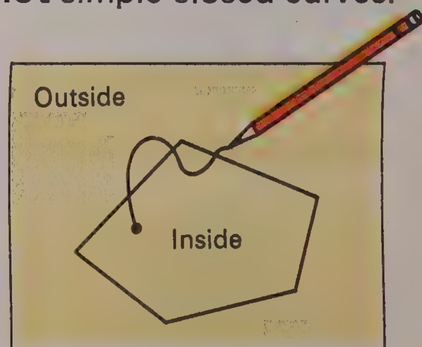


? Can you draw some simple closed curves of your own?

Discussing the Ideas

1. You can think of a simple closed curve as a loop of string that is on a flat surface and does not cross itself. Explain why some of the figures above are **not** simple closed curves.

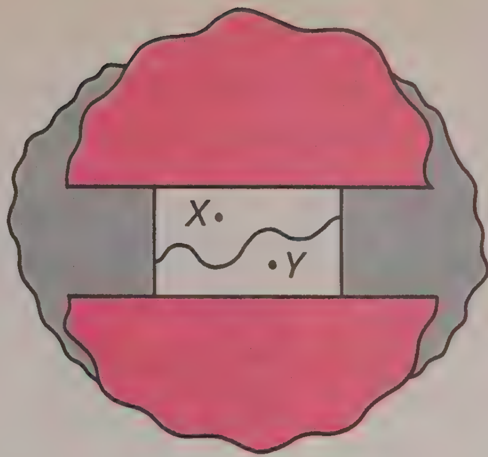
2. Draw a simple closed curve and put a dot inside.



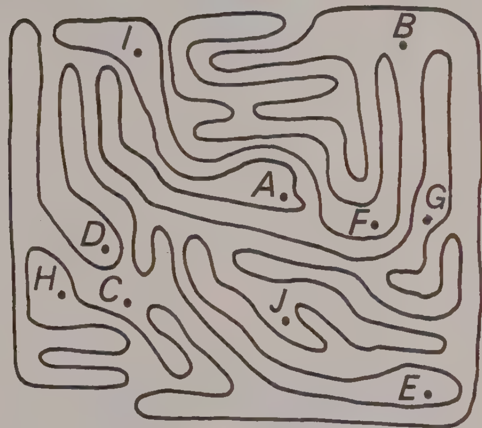
   A Starting at the dot, draw a path that crosses the curve 6 times. Where will the end of your path be?

   B Where will the end of the path be if you cross the curve 9 times?

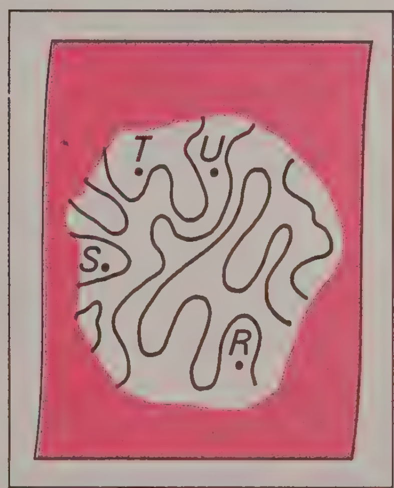
1. The red and gray screens are hiding all but a small part of a simple closed curve.
   - A If X is inside, where is Y?
   - B If X is outside, where is Y?



2. If A is outside the simple closed curve, give the location (inside or outside) of each of the other points.



3. The hole torn in the red paper shows part of a simple closed curve.
   - A If R is inside, where is S?
   - B Can both T and U be inside?
   - C If S is outside, where is T?
   - D If S is outside, where is U?



Let's explore some special simple closed curves.

Investigating the Ideas

You can use your strips to help you "construct" some special simple closed curves.

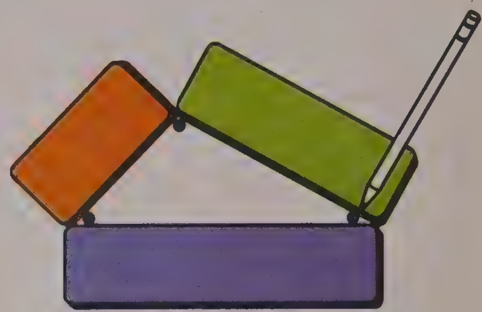
You will need

2 of these →

4 of these →

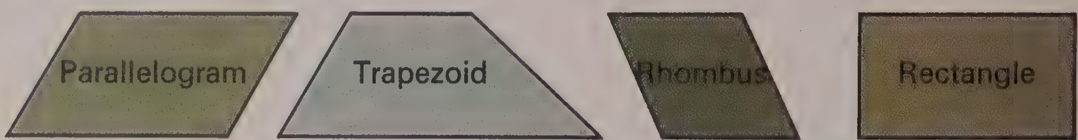
1 of these →

1 of these →



Place the corners of the strips together. Mark a dot at each corner and then connect the dots.

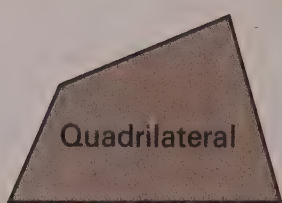
? Which of the special figures below can you "construct" with the strips listed above?



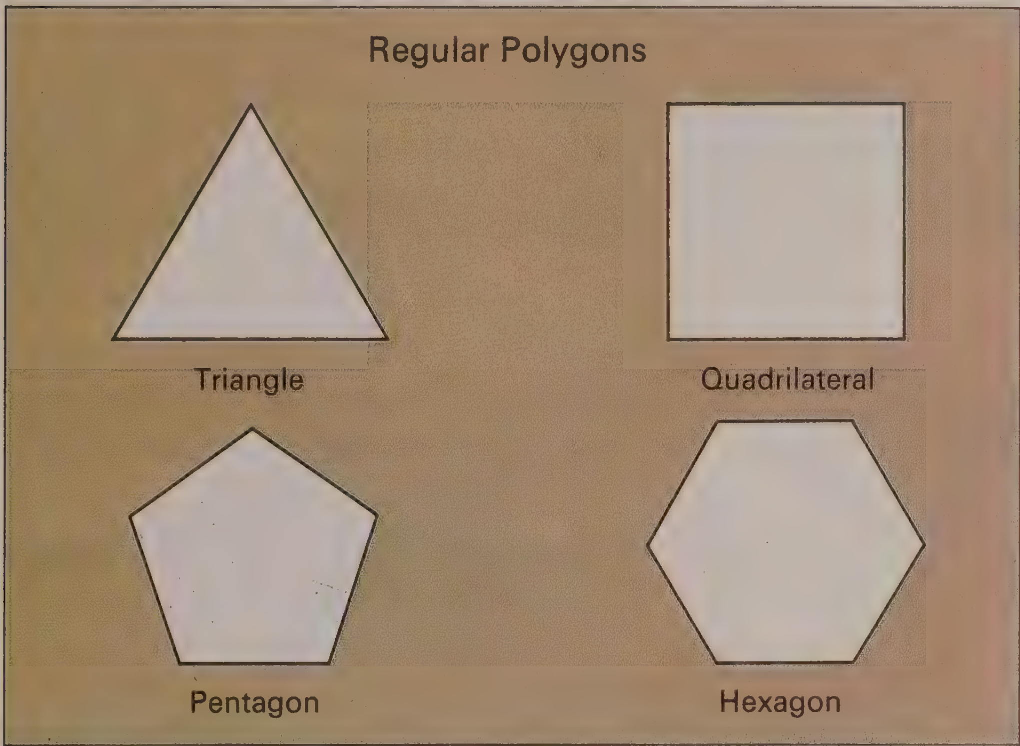
Discussing the Ideas

1. Tell all you can about the special figures you constructed.

2. Simple closed curves whose sides are segments are called **polygons.** A polygon that has four sides is a **quadrilateral.** Can you use the strips to draw a quadrilateral with all of its sides different lengths?



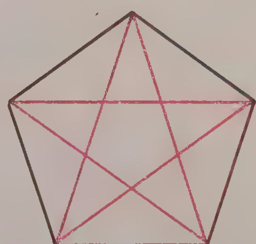
1. A **regular** polygon has all of its sides the same length and all of its angles the same size. What is another name for a regular quadrilateral?



2. Draw one of each kind of polygon shown that is **not** regular. Example:

3. An **octagon** is an 8-sided polygon. Draw an octagon.

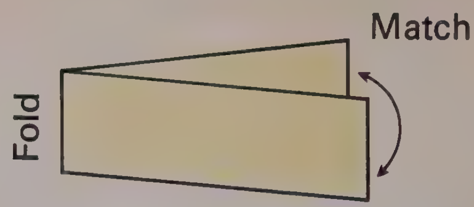
4. This pentagon has all its diagonals shown in color. Can you draw all the diagonals of a hexagon?



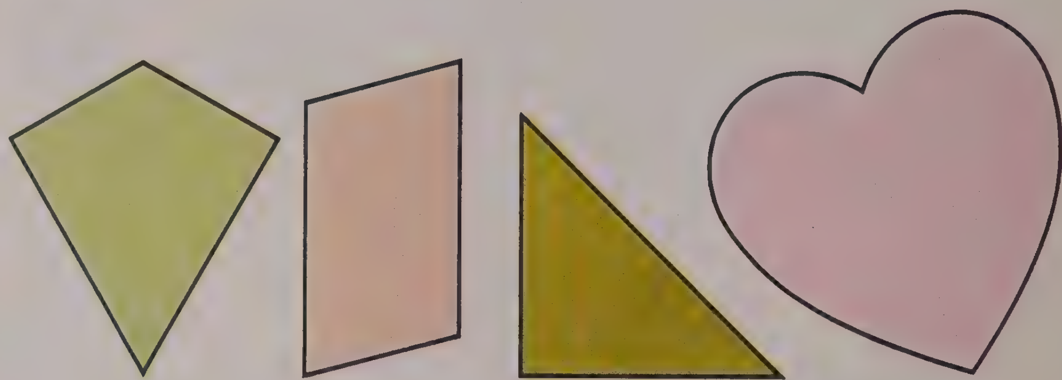
★ 5. How many diagonals does an octagon have?

Investigating the Ideas

A rectangle is **symmetric** because you can fold it so that one half exactly matches the other half.

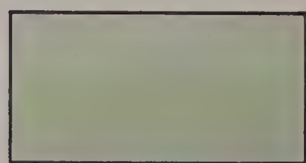


? Can you trace, cut out, and fold to find out which of these figures are symmetric?

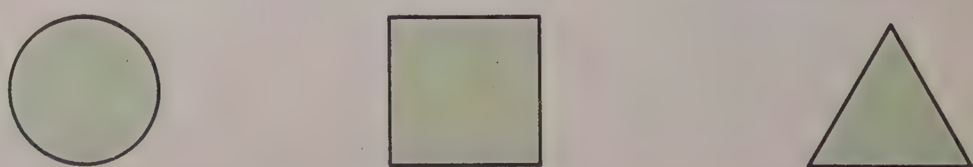


Discussing the Ideas

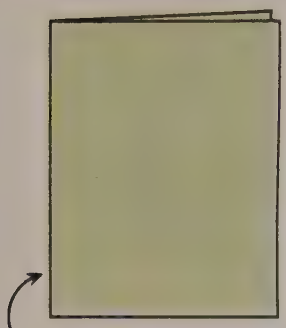
1. A figure is symmetric when it has a **line of symmetry** (the fold). Does a rectangle like this have more than one line of symmetry? Explain.



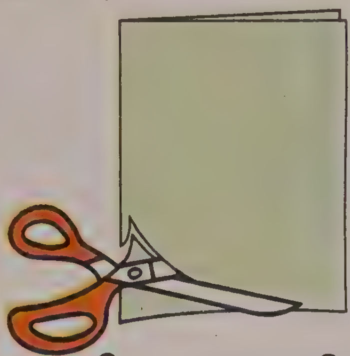
2. Which of these figures have more than one line of symmetry?



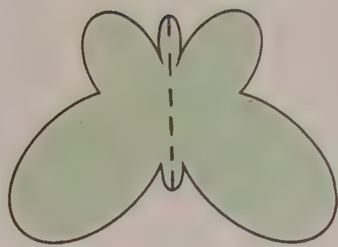
1. You can make your own symmetric figures by folding the paper first.



Fold



Cut a pattern. Start and end on the fold.



Unfold

A Fold and cut out as many different quadrilaterals as you can.
B Cut out some special designs of your own.

2. Some letters are symmetric and some are not. Can you find all the letters that are symmetric ?

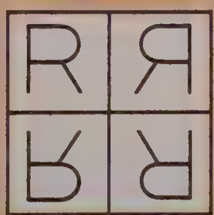
Yes No Yes

3. The word BIKE is a "symmetric word."

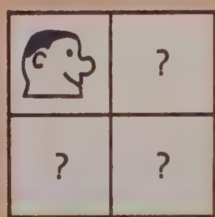
Can you find some other words that are symmetric ?

think

Study the "R" boxes.

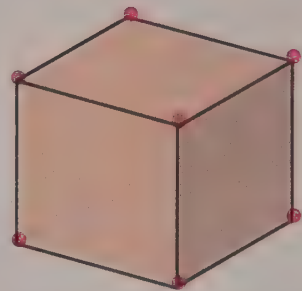


Copy and complete these boxes by using the same pattern.



Reviewing the Ideas

1. The red dots suggest points (vertices).
   A How many can you **see** in the picture?
   B How many vertices does a cube have all together?



2. You can see three faces of the cube.
   A How many faces can you **not** see in the picture?
   B How many faces does a cube have in all?

3. How many edges (segments) can you count in the picture of a cube above?

4. How many right angles does a square have?

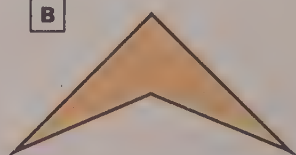
5. Draw a simple closed curve
   A with segments only.
   B with no segments.

6. Draw a quadrilateral (4-sided figure) that has a pair of parallel sides.

7. Which of these figures is symmetric?

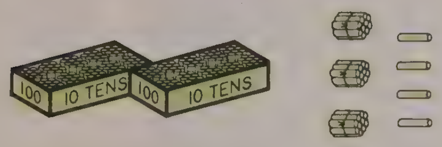
A

B

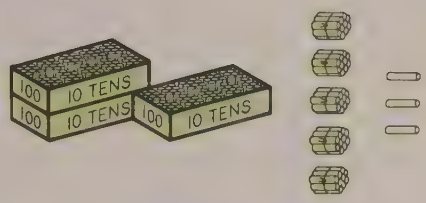


1. How many?

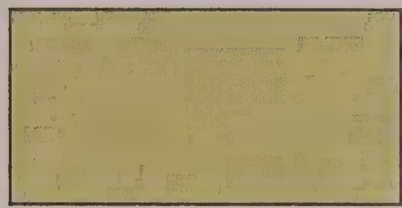
A



B



2. Measure in centimetres.
   A How long?
   B How wide?
   C How far around all four sides?



3. What is the area of the region?

4. Find the sums and differences.

A $36 + 45$	B $48 + 55$	C $96 + 56$	D $74 - 21$	E $63 - 45$	F $81 - 19$
G $714 - 261$	H $2337 + 7665$	I $802 - 358$	J $7037 - 2848$	K $1001 - 747$	
L $132 + 421 + 214$	M $278 + 517 + 809$	N $843 + 126 + 31$	O $425 + 189 + 647$	P $23\,427 + 19\,366 + 53\,109$	

You are invited to explore

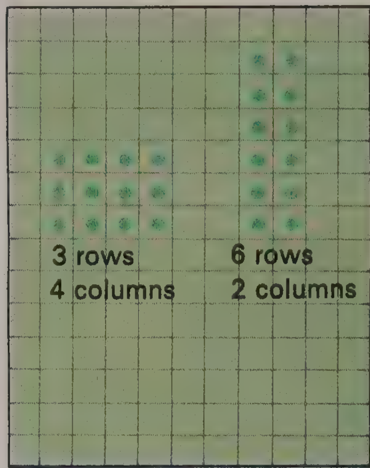
ACTIVITY CARD 4
Page 349

5 Multiplication and Division

Are multiplication and division related?

Investigating the Ideas

The graph paper shows two different ways to arrange 12 counters in a rectangular **array.**



? How many different ways can you arrange 24 counters in a rectangular array?	Record your findings by drawing pictures on graph paper.

Discussing the Ideas

1. Did one of your arrays have 3 rows and 8 columns? If not, try it. Can you solve this multiplication equation?

$$\overset{\text{Factor}}{3} \times \overset{\text{Factor}}{8} = \overset{\text{Product}}{n}$$

2. Did one of your arrays have 4 rows? How many were in each row? Can you solve this division equation?
The factors are sometimes called ⟶ Divisor Quotient

$$\overset{\text{Product}}{24} \div \overset{\text{Factor}}{4} = \overset{\text{Factor}}{n}$$

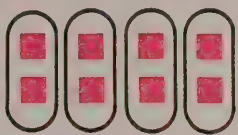
3. How many other multiplication and division equations can you write about your arrays?

Using the Ideas

1. Draw 4 sets of dots with 5 dots in each set.
   A How many dots in all? B Solve: $4 \times 5 = n$

2. Draw a set of 18 dots on your paper.
   Ring as many sets of 3 as you can.
   A How many sets did you ring? B Solve: $18 \div 3 = n$

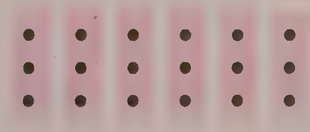
3. Study the sets. Then solve the equation.

A 

$4 \times 2 = n$

B 

$3 \times 7 = n$

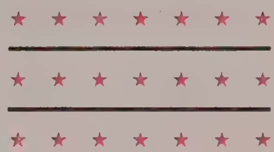
C 

$6 \times 3 = n$

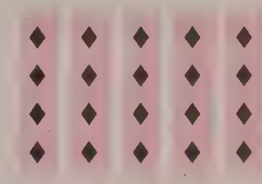
4. Study the sets. Then solve the equation.

A 

$24 \div 6 = n$

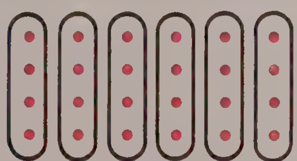
B 

$21 \div 7 = n$

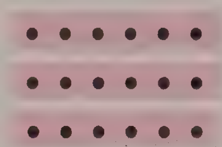
C 

$20 \div 4 = n$

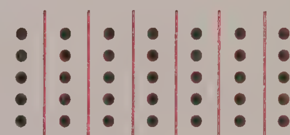
5. Study the sets. Then solve the equations.

A 

$6 \times 4 = n$
$24 \div 4 = n$

B 

$3 \times 6 = n$
$18 \div 6 = n$

C 

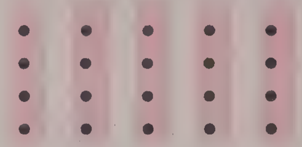
$7 \times 5 = n$
$35 \div 5 = n$

6. Give the missing numbers.
   A 5 threes are ▒▒.
   $5 \times 3 = n$
   B There are ▒▒ fives in 20.
   $20 \div 5 = n$

Are there other ways to find products and quotients?

Investigating the Ideas

5 fours are how many?



$4 + 4 + 4 + 4 + 4 = 20$

$5 \times 4 = 20$

How many fours in 20?

$$\begin{array}{r} 20 \\ -4 \\ \hline 16 \end{array} \quad \begin{array}{r} 16 \\ -4 \\ \hline 12 \end{array} \quad \begin{array}{r} 12 \\ -4 \\ \hline 8 \end{array} \quad \begin{array}{r} 8 \\ -4 \\ \hline 4 \end{array} \quad \begin{array}{r} 4 \\ -4 \\ \hline 0 \end{array}$$

$20 \div 4 = 5$

? Can you **add** enough fours to find 17×4?
Can you **subtract** enough fours to find $52 \div 4$?

Discussing the Ideas

1. Explain how you could find this product by adding. 7×9

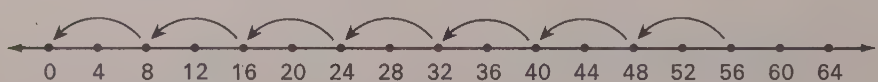
2. How could you find this quotient by subtracting? $54 \div 6$

3. Add together a "string of sevens" (as many as you want). Write a multiplication and a division equation about your work.

4. Use the number line to help you solve the equations.

A $5 \times 8 = n$ B $6 \times 8 = n$ C $4 \times 8 = n$

5. Use the number line to help you solve the equations.



A $48 \div 8 = n$ B $32 \div 8 = n$ C $56 \div 8 = n$

1. Solve the equations.

A $6 + 6 + 6 + 6 = n$
$4 \times 6 = n$

B $9 + 9 + 9 = n$
$3 \times 9 = n$

C $7 + 7 + 7 + 7 = n$
$4 \times 7 = n$

D $8 + 8 + 8 + 8 + 8 = n$
$5 \times 8 = n$

2. Copy the equations. Write the missing numbers instead of n.

A $24 - 8 = n$
$16 - 8 = n$
$8 - 8 = n$

$24 \div 8 = n$

B $45 - 9 = n$
$36 - 9 = n$
$27 - 9 = n$
$18 - 9 = n$
$9 - 9 = n$

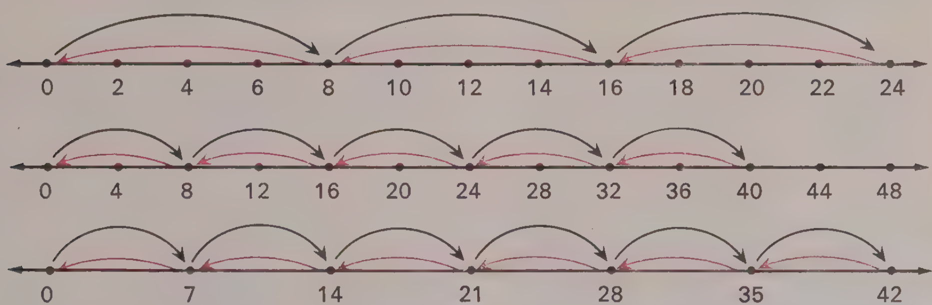
$45 \div 9 = n$

C $28 - 7 = n$
$21 - 7 = n$
$14 - 7 = n$
$7 - 7 = n$

$28 \div 7 = n$

3. Think about the black arrows and write a multiplication equation. Think about the red arrows and write a division equation.

A
B
C



★ 4. Use addition or subtraction to solve these equations.

A $2 \times 5280 = n$
B $204 \div 68 = n$
C $3 \times 526 = n$
D $332 \div 83 = n$
E $3 \times 27\,800 = n$
F $300 \div 75 = n$
G $147 \div 49 = n$

think

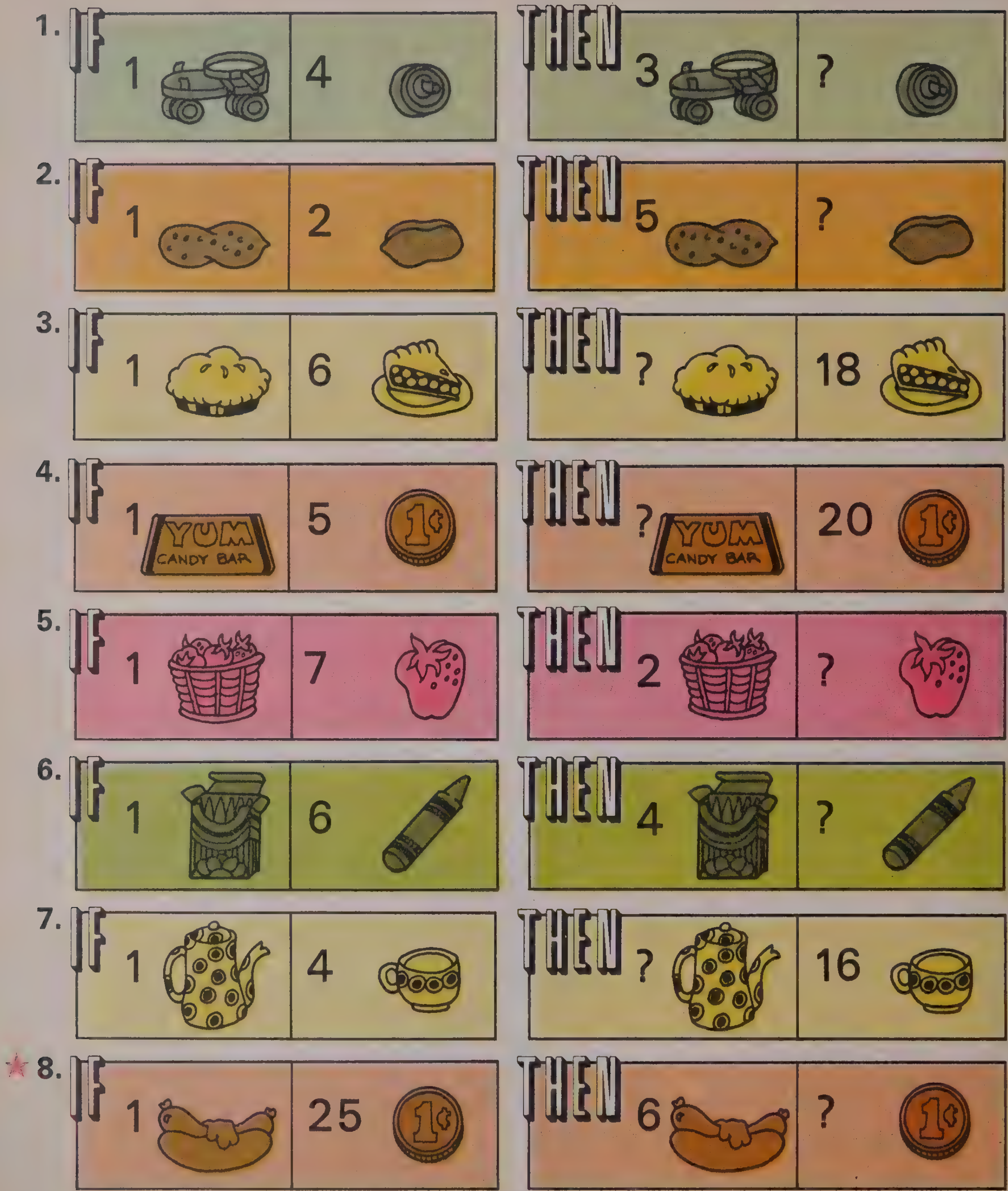
$587 \times 7285 = 4{,}276{,}295$

Use this equation and addition or subtraction to find these products.

$588 \times 7285 = n$
$586 \times 7285 = n$

More practice, page A-11, Set 18

Short Picture Problems



Short Stories

Write a multiplication or division equation for each exercise. Then find the solution.

1 4 boxes. 8 crayons in each box. How many crayons?

2 24 marbles. 3 in each bag. How many bags?

3 3 sets. 7 cards in each set. How many cards?

4 36 boys. 9 on each team. How many teams?

5 5 bags of candy. 7 pieces in each bag. How many pieces?

6 30 band members. 5 in each row. How many rows?

7 6 cards. 6 pencils on each card. How many pencils?

8 32 children. Divided into groups of 4. How many groups?

9 7 boxes. 4 tennis balls in each box. How many tennis balls?

10 Candy: 5 cents each. Had 25 cents. Can buy how many?

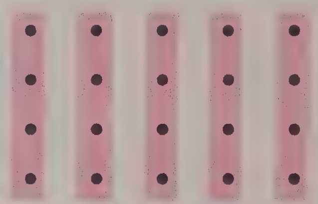
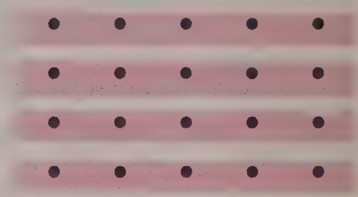
★ 11 84 children. 28 in each class. How many classes?

★ 12 Ballpoint pens: 39 cents each. Bought 4. How much in all?

Discussing the Ideas

1. A There is an ORDER PRINCIPLE for addition.
   Here is an example:
   $6 + 7 = 13$ $\qquad$ $7 + 6 = 13$
   Can you give this principle in your own words?

   B Is there an ORDER PRINCIPLE for multiplication?
   Here are two ways to think about a set of 20 dots.

In columns	In rows
	
We see 5 sets of 4. We write: $5 \times 4 = n$	We see 4 sets of 5. We write: $4 \times 5 = n$

   Can you solve the equations and give this principle for multiplication in your own words?

2. Can you solve the equations and give a principle about multiplying by one?

4 sets. 1 dot in each.	1 set of 4 dots.
	
$4 \times 1 = n$	$1 \times 4 = n$

3. Can you give a principle about multiplying by zero?

4 sets. 0 dots in each.	0 sets of 4 dots.
	
$4 \times 0 = 0$	$0 \times 4 = 0$

1. Find the missing numbers.
   - A Since $4 \times 3 = 12$, we know that $3 \times 4 = n$.
   - B Since $3 \times 6 = 18$, we know that $6 \times 3 = n$.
   - C Since $5 \times 3 = 15$, we know that $3 \times 5 = n$.
   - D Since $8 \times 7 = 56$, we know that $7 \times 8 = n$.
   - E Since $9 \times 6 = 54$, we know that $6 \times 9 = n$.

2. Find the products. Use the table if you need help.

A 14×8	E 15×19
B 56×38	F 28×37
C 49×36	G 39×28
D 16×27	H 57×49

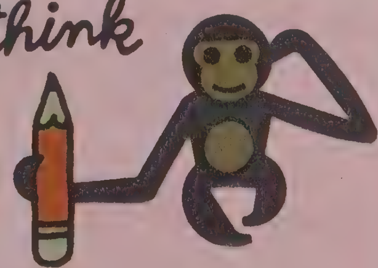
$38 \times 56 = 2128$	$27 \times 16 = 432$
$49 \times 57 = 2793$	$28 \times 39 = 1092$
$37 \times 28 = 1036$	$19 \times 15 = 285$
$36 \times 49 = 1764$	$8 \times 14 = 112$

3. Find the missing numbers.
   - A Since $9 \times 1 = 9$, we know that $1 \times 9 = n$.
   - B Since $5 \times 0 = 0$, we know that $0 \times 5 = n$.
   - C Since $1 \times 7 = 7$, we know that $7 \times 1 = n$.
   - D Since $0 \times 8 = 0$, we know that $8 \times 0 = n$.

4. Find the equation that has no solution. Find the equation that has many solutions. Solve the other equations.

A $8 \times 0 = n$	F $9 \times n = 9$
B $6 \times 1 = n$	G $n \times 1 = 78$
C $1 \times n = 5$	H $0 \times n = 0$
D $n \times 7 = 0$	I $586 \times 0 = n$
E $n \times 0 = 24$	J $0 \times 76 = n$

think

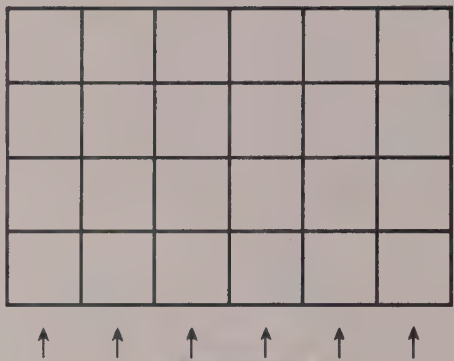


Give the pairs of numbers (in order) for the gray spaces.

	Products		×		Differences
A	6		×		1
B	15		×		2
C	36		×		0
D	72		×		1
E	54		×		3
F	0		×		9

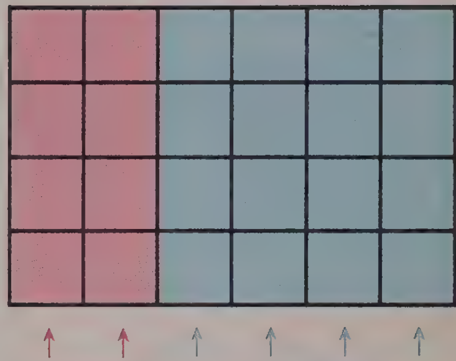
● *Let's explore the multiplication-addition principle.*

Investigating the Ideas



6 fours

The graph paper shows
6 columns of 4 squares.



2 fours   4 fours

Here is another way
to think of 6 fours.

? Using graph paper and two crayons, how many other ways can you color the rectangle to help you think of 6 fours?

Discussing the Ideas

1. Read the sentence and give the missing number.
  A 6 fours are the same as 2 fours and __?__ fours.
  B 6 fours are the same as 3 fours and __?__ fours.
  C 6 fours are the same as 5 fours and __?__ four.

2. Complete this sentence in as many different ways as you can.
  7 fives are the same as __?__ fives and __?__ fives.

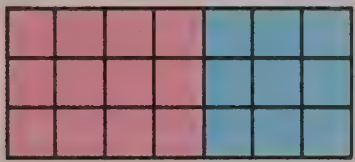
3. You might think about the multiplication-addition principle like this:

  When we multiply, we can "break apart" a factor.

  What number did you "break apart" in exercise 2?

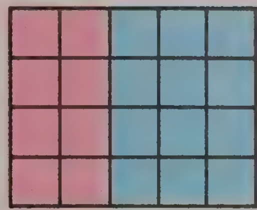
1. Give the missing numbers.

A 7 threes



4 threes and ___?___ threes

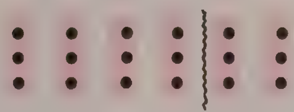
B 5 fours



2 fours and ___?___ fours

2. Find the missing number of threes.

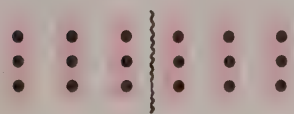
A



For 6 sets of 3, we can think

4 threes and ___ threes.

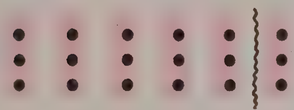
B



For 6 sets of 3, we can think

3 threes and ___ threes.

C



For 6 sets of 3, we can think

5 threes and ___ three.

3. Find the missing number.
Then solve the equation.

A 7 twos → 4 twos and ___ twos

$7 \times 2 = (4 \times 2) + (\ n \ \times 2)$

B 7 twos → 5 twos and ___ twos

$7 \times 2 = (5 \times 2) + (\ n \ \times 2)$

C 7 twos → 6 twos and ___ two

$7 \times 2 = (6 \times 2) + (\ n \ \times 2)$

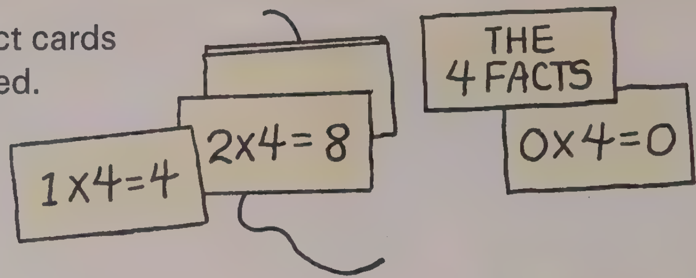
think

1. If today is Wednesday, the 10th of December, what will the date be in a week? In 2 weeks? In 3 weeks?

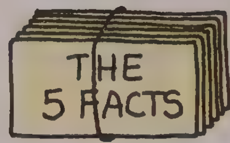
2. What day of the week is January 1 of the next year? December has 31 days.

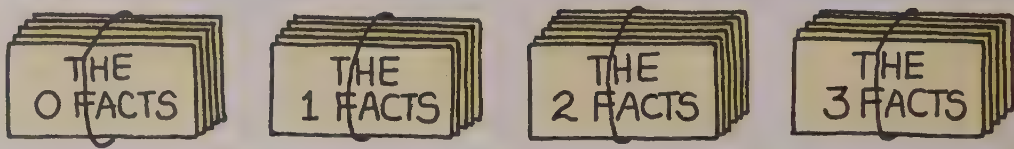
Investigating the Ideas

One pack of fact cards has been opened.



? Can you make all the cards in one of these sets of facts?





Discussing the Ideas

1. Do you know the facts when 0 or 1 is a factor? Can you find these products in 1 minute? Try it.

A 0×7	D 1×6	G 1×3	J 0×0	M 8×1	P 1×2
B 7×1	E 0×4	H 1×1	K 5×1	N 7×0	Q 6×0
C 5×0	F 9×0	I 0×8	L 1×0	O 0×3	R 9×1

2. Do you know the facts when 2 or 3 is a factor? Can you find these products in 2 minutes? Try it.

A 2×5	D 5×3	G 2×2	J 2×6	M 3×7	P 2×7
B 7×2	E 3×8	H 2×3	K 6×3	N 3×5	Q 7×3
C 3×4	F 8×2	I 4×2	L 2×9	O 6×2	R 3×9

3. Do you know the facts when 4 or 5 is a factor? Can you find these products in 2 minutes? Try it.

A 4×2	D 7×5	G 7×4	J 8×5	M 0×4	P 4×5
B 5×6	E 4×8	H 3×5	K 4×6	N 5×9	Q 0×5
C 1×4	F 4×3	I 5×2	L 4×4	O 5×5	R 9×4

1. "2" facts Find the products.

A 2×3
B 5×2
C 8×2
D 2×9
E 2×7
F 2×1
G 6×2
H 0×2
I 2×2
J 4×2
K 3×2
L 2×8

2. "3" facts Find the products.

A 3×3
B 5×3
C 8×3
D 3×9
E 3×7
F 3×1
G 6×3
H 0×3
I 3×2
J 4×3
K 3×3
L 3×8

3. "4" facts Find the products.

A 4×3
B 5×4
C 8×4
D 4×9
E 4×7
F 4×1
G 6×4
H 0×4
I 4×2
J 4×4
K 3×4
L 4×8

4. "5" facts Find the products.

A 5×3
B 5×5
C 8×5
D 5×9
E 5×7
F 5×1
G 6×5
H 0×5
I 5×2
J 4×5
K 3×5
L 5×8

5. "0, 1, 2, 3, 4, 5" facts

Find the products.

A 3×5
B 2×6
C 6×5
D 5×0
E 4×6
F 1×7
G 5×8
H 4×3
I 4×4
J 5×1
K 4×2
L 2×8
M 3×6
N 0×8
O 9×3
P 9×1
Q 3×2
R 6×0
S 5×5
T 1×3
U 4×5
V 0×7
W 8×4
X 5×2

6. Copy the table. Complete the colored part of the table.

×	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3							18			
4										
5										
6				18						
7										
8										
9										

● *Let's explore the "larger" multiplication facts.*

Investigating the Ideas

Use one of these methods to help you find 8×6.

Maybe you know 4×6. 8 sixes are the same as 4 sixes and 4 sixes.	Maybe you are good at adding. $6+6+6+6+6+6+6+6$	Maybe you already know 6×8. $8 \times 6 = 6 \times 8$

?	How many ways can you find 7×6?	Record your different methods.

Discussing the Ideas

1. "6" facts Solve the equations to find the products in the **6 row.**
   - A 6×6: $(3 \times 6) + (3 \times 6) = n$
   - B 6×7: $(3 \times 7) + (3 \times 7) = n$
   - C 6×8: $(3 \times 8) + (3 \times 8) = n$
   - D 6×9: $(3 \times 9) + (3 \times 9) = n$

×	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4										
5										
6							A	B	C	D
7							E	H	I	J
8							F	K		
9							G	L		

2. Use the order principle to find the products in the **6 column** (E, F, G in the table).

3. "7" facts Solve the equations to find the products in the **7 row.**
   - A 7×7: $(6 \times 7) + 7 = n$
   - B 7×8: $(6 \times 8) + 8 = n$
   - C 7×9: $(6 \times 9) + 9 = n$

4. Find the products in the **7 column** (K, L in the table).

1. "8" facts Solve the equations to find products in the **8 row.**

A 8×8: $(4 \times 8) + (4 \times 8) = n$

B 8×9: $(4 \times 9) + (4 \times 9) = n$

C Use the order principle to find 9×8 (**C** in the table).

"9" facts Solve either of the equations to find 9×9.

D 9×9: $(8 \times 9) + 9 = n$

9×9: $(10 \times 9) - 9 = n$

×	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4										
5										
6										
7										
8									A	B
9									C	D

2. Find the products.

A 7×0	E 7×5	I 7×9	M 8×6	Q 9×2	U 9×6
B 7×1	F 7×6	J 8×3	N 8×7	R 9×3	V 9×7
C 7×2	G 7×7	K 8×4	O 8×8	S 9×4	W 9×8
D 7×3	H 7×8	L 8×5	P 8×9	T 9×5	X 9×9

3. Find the products.

A $\begin{array}{r} 5 \\ \times 6 \\ \hline \end{array}$ B $\begin{array}{r} 0 \\ \times 7 \\ \hline \end{array}$ C $\begin{array}{r} 4 \\ \times 4 \\ \hline \end{array}$ D $\begin{array}{r} 4 \\ \times 9 \\ \hline \end{array}$ E $\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$ F $\begin{array}{r} 8 \\ \times 6 \\ \hline \end{array}$ G $\begin{array}{r} 9 \\ \times 7 \\ \hline \end{array}$

H $\begin{array}{r} 3 \\ \times 9 \\ \hline \end{array}$ I $\begin{array}{r} 6 \\ \times 8 \\ \hline \end{array}$ J $\begin{array}{r} 7 \\ \times 9 \\ \hline \end{array}$ K $\begin{array}{r} 10 \\ \times 9 \\ \hline \end{array}$ L $\begin{array}{r} 6 \\ \times 9 \\ \hline \end{array}$ M $\begin{array}{r} 6 \\ \times 7 \\ \hline \end{array}$ N $\begin{array}{r} 6 \\ \times 8 \\ \hline \end{array}$

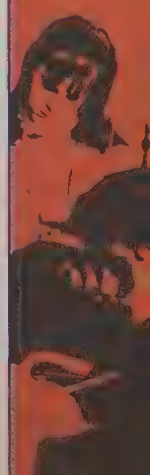
4. Find the products.

A 6×0	C 6×6	E 5×9	G 6×7	I 5×8	K 0×0
B 9×1	D 6×8	F 7×8	H 5×5	J 0×9	L 8×9

★ **5.** Write two 1-digit numbers whose product is one less than the product of the numbers given.

Example: 5,5 ⟶ 4×6 is one less than 5×5.

A 4,4 B 6,6 C 8,8 D 2,2 E 7,7 F 3,3



More practice, page A-11, Set 19

Are there patterns for the multiplication facts?

Investigating the Ideas

The set of products when 9 is a factor has some interesting patterns.

$2 \times 9 = 18$
$3 \times 9 = 27$
$4 \times 9 = 36$
$5 \times$ 45

$9 \times$

? Can you find the rest of the products without thinking about multiplying?

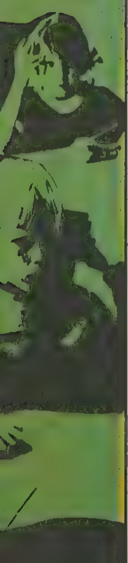
Discussing the Ideas

1. The products 5×9 and 6×9 both have the same digits, 4 and 5. Suppose you can't remember which is which. Can you think of something that would help you?

2. Are there other pairs of products above that have the same digits?

3. Here is a pattern for the nines. Test it by completing the list to 9×9.

$1 \times 9 = 10 - 1$
$2 \times 9 = 20 - 2$
$3 \times 9 = 30 - 3$
$4 \times 9 = 40 - 4$
$5 \times 9 = 50 - 5$
$\vdots$
$9 \times 9 = \ ? - \ ?$



1. Continue this list to 9×5. What can you say about the product when 5 is a factor?

$$2 \times 5 = 10$$
$$3 \times 5 = 15$$
$$4 \times 5 = 20$$
$$5 \times 5 = 25$$
$$6 \times 5 = 30$$
$$\vdots$$

2. Some facts have a kind of rhyme. Can you find other facts that rhyme?

Six times eight
is forty-eight.

3. Here is a pattern for the eights. Check it by completing it to 9×8.

$$1 \times 8 = 10 - 2$$
$$2 \times 8 = 20 - 4$$
$$3 \times 8 = 30 - 6$$
$$\vdots$$

think

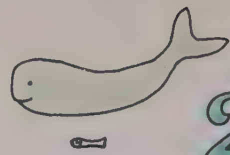
Give the pairs of numbers that could serve as both addends and factors in the gray spaces.

	Sums	+	×	+	Products
A	5		✕		6
B	7		✕		12
C	10		✕		24
D	11		✕		24
E	6		✕		9
F	4		✕		4
G	2		✕		1

	Sums	+	×	+	Products
H	14		✕		45
I	14		✕		49
J	15		✕		56
K	16		✕		64
L	17		✕		72
M	15		✕		54
N	13		✕		42

Solving Short Story Problems

1 Tallest man on record: about 3 metres tall. Tallest giraffe: about two times as tall. How tall ?



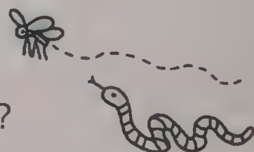
2 Pike fish: 1 metre long. Baby whale: 8 times as long. How long ?

3 Rowboat: 3 metres long. Longest crocodile: almost 4 times as long. About how long ?

4 Flea jump: 9 centimetres. Grasshopper jump: 8 times as far. How far ?

5 Ostrich egg weighs 2 kilograms. How much do 9 ostrich eggs weigh ?

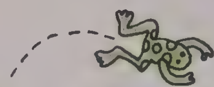
6 Diamondback rattlesnake: 2 metres long. Longest python snake: over 5 times as long. About how long ?



7 Measured speed for a snake: 9 kilometres per hour. Measured speed for an insect: 5 times as fast. How fast ?

8 Porpoise: 2 metres long. Whale: 9 times as long. How long ?

9 1 octopus: 8 tentacles. 7 octopuses: How many tentacles ?



10 A fairly good frog jump: 2 metres. Long kangaroo jump: 7 times as far. How far ?

11 Tall ostrich: 3 metres tall. Small jungle tree: 6 times as tall. How tall ?

12 Slow bird: 9 kilometres per hour. Fastest duck: 8 times as fast. How fast ?

More practice, page A-12, Set 20

Keeping in Touch with Addition Subtraction

1. Find the sums and differences.

A $\begin{array}{r} 32 \\ +57 \\ \hline \end{array}$ B $\begin{array}{r} 87 \\ -24 \\ \hline \end{array}$ C $\begin{array}{r} 54 \\ +29 \\ \hline \end{array}$ D $\begin{array}{r} 53 \\ -26 \\ \hline \end{array}$ E $\begin{array}{r} 134 \\ -67 \\ \hline \end{array}$ F $\begin{array}{r} 87 \\ +69 \\ \hline \end{array}$

2. Find the sums.

A $\begin{array}{r} 7 \\ 6 \\ +8 \\ \hline \end{array}$ B $\begin{array}{r} 9 \\ 7 \\ +3 \\ \hline \end{array}$ C $\begin{array}{r} 29 \\ 37 \\ +53 \\ \hline \end{array}$ D $\begin{array}{r} 54 \\ 67 \\ +36 \\ \hline \end{array}$ E $\begin{array}{r} 78 \\ 37 \\ +85 \\ \hline \end{array}$ F $\begin{array}{r} 89 \\ 97 \\ +68 \\ \hline \end{array}$

G $\begin{array}{r} 347 \\ +652 \\ \hline \end{array}$ H $\begin{array}{r} 978 \\ +867 \\ \hline \end{array}$ I $\begin{array}{r} 763 \\ +898 \\ \hline \end{array}$

J $\begin{array}{r} 386 \\ 294 \\ +651 \\ \hline \end{array}$ K $\begin{array}{r} 418 \\ 690 \\ +789 \\ \hline \end{array}$ L $\begin{array}{r} 916 \\ 807 \\ +398 \\ \hline \end{array}$

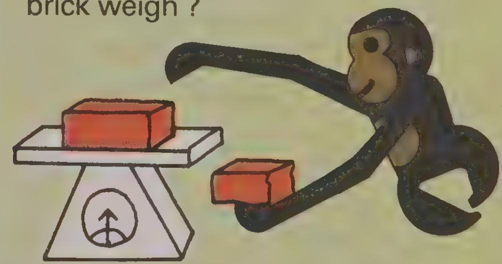
3. Find the differences.

A $\begin{array}{r} 592 \\ -347 \\ \hline \end{array}$ B $\begin{array}{r} 823 \\ -458 \\ \hline \end{array}$ C $\begin{array}{r} 937 \\ -386 \\ \hline \end{array}$

D $\begin{array}{r} 5832 \\ -2567 \\ \hline \end{array}$ E $\begin{array}{r} 506 \\ -219 \\ \hline \end{array}$ F $\begin{array}{r} 8007 \\ -4234 \\ \hline \end{array}$

think

Suppose a brick weighs 4 kilograms more than half a brick. How much does the brick weigh?



4. Find the sums and differences.

A $5 + 3 + 7 + 6 = n$

B $385 - 234 = n$

C $53 + 47 = n$

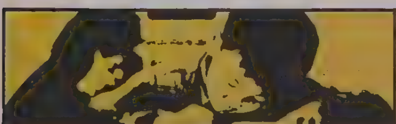
D $32 + 33 + 34 = n$

E $403 - 395 = n$

F $613 + 56 + 9 = n$

G $485 + 386 + 67 = n$

H $807 - 467 = n$

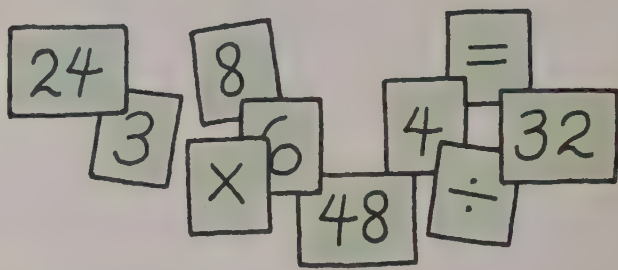


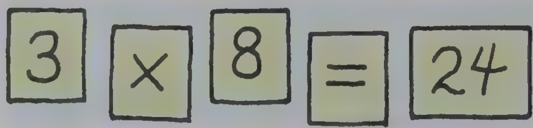
You are invited to explore

ACTIVITY CARD 5
Page 349

Investigating the Ideas

Cut out 10 slips of paper. Put one of these numerals or signs on each one.





? How many different equations can you "write" with your slips of paper?	Record each equation on a sheet of paper.

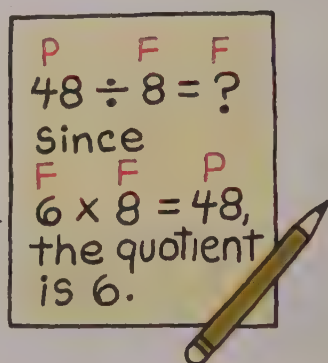
Discussing the Ideas

1. Which of the numbers in the Investigation could you use as factors?

2. Which numbers were sometimes used as quotients?

3. Which numbers were used as products?

4. Tim saw Fred's arithmetic paper. It looked like this.→
Tim asked, "What do the red letters mean?"
Can you answer Tim's question?



1. Find the missing factors.

A To find this quotient, think $? \times 3 = 18$

$18 \div 3$

B To find this quotient, think $? \times 5 = 35$

$35 \div 5$

C To find this quotient, think $? \times 4 = 12$

$12 \div 4$

2. Solve the equations.

A $18 \div 3 = n$ B $35 \div 5 = n$ C $12 \div 4 = n$

In the following exercises, when you find the **missing factor** in equation A, you will have found the **quotient** in equation B. Write equation B with the correct quotient.

3. A $n \times 3 = 21$ B $21 \div 3 = n$

4. A $n \times 8 = 32$ B $32 \div 8 = n$

5. A $n \times 3 = 24$ B $24 \div 3 = n$

6. A $n \times 2 = 14$ B $14 \div 2 = n$

7. A $n \times 5 = 25$ B $25 \div 5 = n$

8. A $n \times 7 = 28$ B $28 \div 7 = n$

9. A $n \times 4 = 36$ B $36 \div 4 = n$

10. A $n \times 5 = 40$ B $40 \div 5 = n$

11. A $n \times 7 = 49$ B $49 \div 7 = n$

12. A $n \times 9 = 18$ B $18 \div 9 = n$

13. A $n \times 3 = 27$ B $27 \div 3 = n$

14. A $n \times 4 = 16$ B $16 \div 4 = n$

15. A $n \times 6 = 30$ B $30 \div 6 = n$

16. A $n \times 5 = 45$ B $45 \div 5 = n$

17. A $n \times 6 = 42$ B $42 \div 6 = n$

18. A $n \times 8 = 48$ B $48 \div 8 = n$

19. A $n \times 6 = 54$ B $54 \div 6 = n$

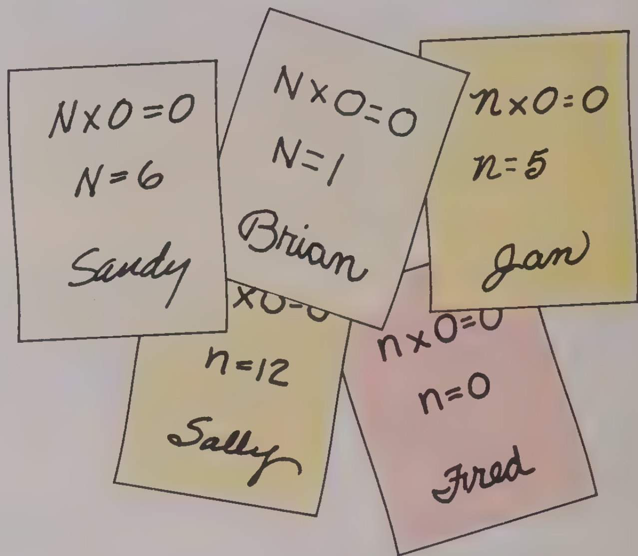
20. A $n \times 7 = 35$ B $35 \div 7 = n$

More practice, page A-12, Set 21

Investigating the Ideas

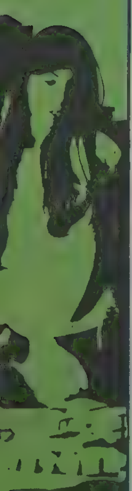
Check each paper to see who is correct. Do you see that there are many correct answers to the equation?

Solve: $n \times 0 = 0$



? How many correct answers can you find for this equation? $n \times 0 = 5$

Discussing the Ideas



1. Explain how the papers above show why we

   NEVER DIVIDE BY ZERO.

2. Choose any number. Divide it by 1. What number do you get?

3. Choose any number (except 0). Divide it by itself. What number do you get?

4. Divide 0 by any number (except 0). What number do you get?

DIVIDING BY 1, 2, 3, and 4

1. Find the quotients.

A $8 \div 2 = n$	H $18 \div 3 = n$	O $27 \div 3 = n$
B $9 \div 1 = n$	I $36 \div 4 = n$	P $20 \div 4 = n$
C $24 \div 3 = n$	J $18 \div 2 = n$	Q $16 \div 2 = n$
D $16 \div 4 = n$	K $12 \div 3 = n$	R $15 \div 3 = n$
E $14 \div 2 = n$	L $21 \div 3 = n$	S $6 \div 2 = n$
F $9 \div 3 = n$	M $2 \div 2 = n$	T $8 \div 1 = n$
G $28 \div 4 = n$	N $32 \div 4 = n$	U $0 \div 2 = n$

DIVIDING BY 5, 6, and 7

2. Find the quotients.

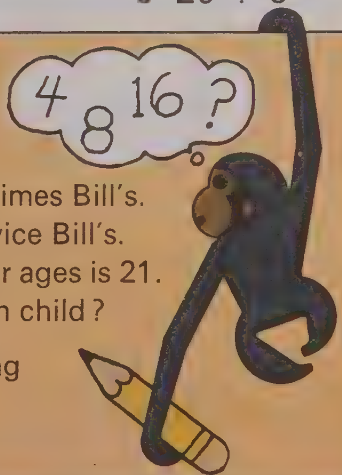
A $25 \div 5 = n$	H $42 \div 7 = n$	O $56 \div 7 = n$
B $24 \div 6 = n$	I $30 \div 6 = n$	P $40 \div 5 = n$
C $14 \div 7 = n$	J $35 \div 5 = n$	Q $49 \div 7 = n$
D $36 \div 6 = n$	K $48 \div 6 = n$	R $5 \div 5 = n$
E $28 \div 7 = n$	L $21 \div 7 = n$	S $54 \div 6 = n$
F $0 \div 5 = n$	M $45 \div 5 = n$	T $63 \div 7 = n$
G $12 \div 6 = n$	N $35 \div 7 = n$	U $20 \div 5 = n$

DIVIDING BY 8 and 9

3. Find the quotients.

A $24 \div 8$	H $81 \div 9$
B $27 \div 9$	I $64 \div 8$
C $54 \div 9$	J $63 \div 9$
D $0 \div 8$	K $36 \div 9$
E $45 \div 9$	L $72 \div 8$
F $48 \div 8$	M $56 \div 8$
G $32 \div 8$	N $72 \div 9$

think



Ann's age is 4 times Bill's.
Fred's age is twice Bill's.
The sum of their ages is 21.
How old is each child?

Begin by making a trial guess.

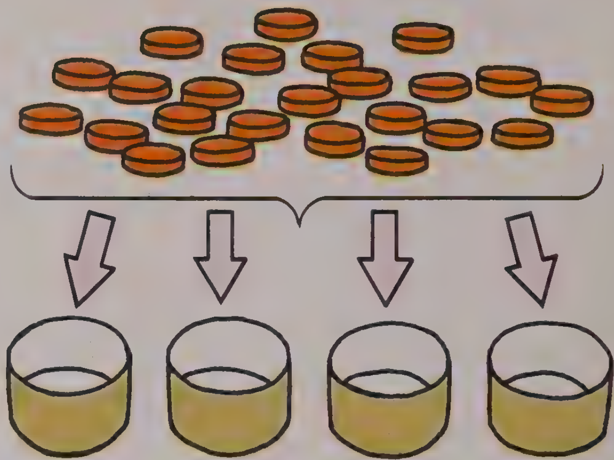
More practice, page A-13, Set 22

Let's explore division and sets again.

Investigating the Ideas

Try to divide 24 counters equally into 4 sets.

Can you divide them equally into 5 sets?



? In how many ways can you divide 24 counters equally into sets?	Record each result by writing a division equation.

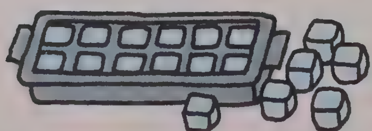
Discussing the Ideas

1. You can use division to find how many sets.
   Solve the equation to find out.

18 strawberries

→ How many bowls of 6 strawberries can you serve? → $18 \div 6 = n$

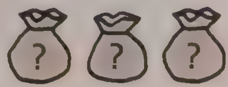
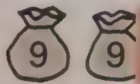
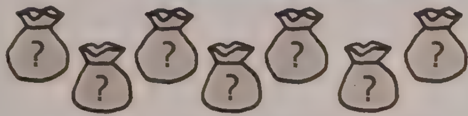
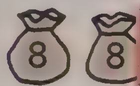
2. You can use division to find how many in each set.
   Solve the equation to find out.



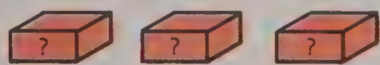
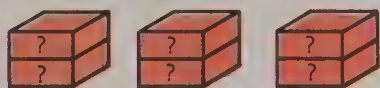
18 ice cubes

→ How many can you put in each glass if you divide them equally among 6 glasses? → $18 \div 6 = n$

1. The bags in each exercise have the same number of marbles.

A		How many marbles in each bag?	27 marbles
B	 How many bags?	9 marbles in each bag.	54 marbles
C		How many marbles in each bag?	56 marbles
D	 How many bags?	8 marbles in each bag.	72 marbles

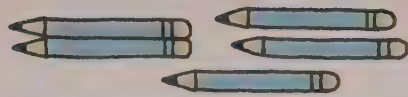
2. The boxes in each exercise have the same number of checkers.

A	24 checkers		How many in each box?
B	32 checkers		How many boxes?
C	48 checkers		How many in each box?
D	54 checkers		How many boxes?

3. A How many darts must Don throw into the red centre to get a score of 36?
   B How many darts must Bob throw into the red centre to get a score of 63?
   C How many darts must Glen throw into the white ring to get a score of 48?

Solving Short Picture Problems

Solving Short Stories



1 32 buttons. 8 on each shirt. How many shirts?

2 6 boxes of pencils. 48 pencils in all. How many in each box?

3 5 tires per car. 8 cars. How many tires?

4 6 weeks. 7 days per week. How many days?

5 36 players divided equally into 6 teams. How many per team?

6 Apples: 9 cents each. You have 45 cents. How many can you buy?

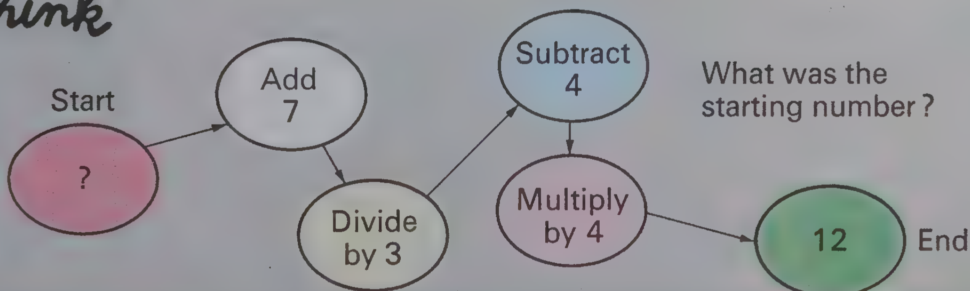
7 Bicycling: 9 kilometres each hour. 45 km to go. How long will it take?

8 40 cookies. 8 hungry children. Divide the cookies equally. How many for each child?

9 9 jet airplanes. 4 jet engines per plane. How many jet engines?

10 Had 50 cents. Lost a dime and spent the rest on nickel candy bars. Bought how many candy bars?

think



What was the starting number?

More practice, page A-13, Set 23

Can you give the products and quotients?

The figure will help you review a different way to write division exercises. →

$$30 \div 5 = 6 \qquad 5\overline{)30}^{\,6}$$

1. Find the quotients.

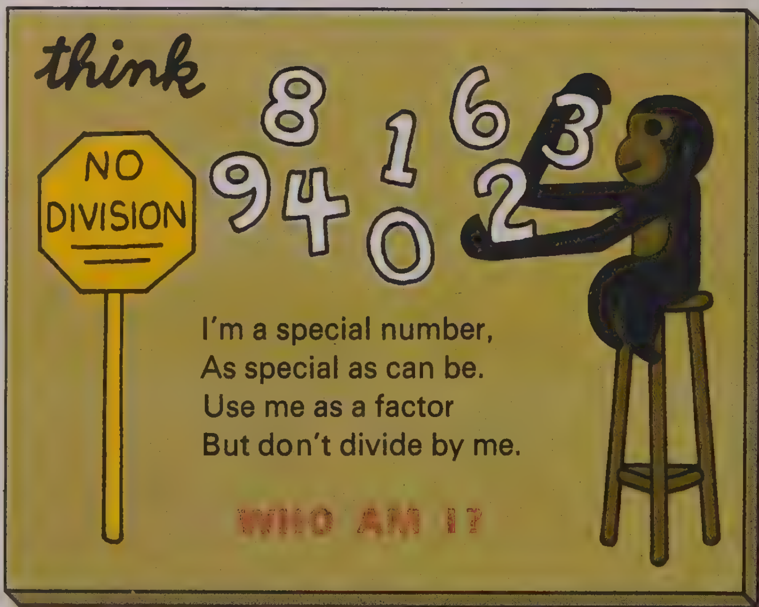
A $4\overline{)16}$	F $7\overline{)56}$	K $5\overline{)40}$	P $5\overline{)35}$	U $5\overline{)20}$
B $8\overline{)32}$	G $9\overline{)63}$	L $1\overline{)9}$	Q $4\overline{)36}$	V $8\overline{)64}$
C $8\overline{)8}$	H $6\overline{)54}$	M $6\overline{)24}$	R $3\overline{)27}$	W $1\overline{)8}$
D $6\overline{)42}$	I $8\overline{)72}$	N $6\overline{)6}$	S $7\overline{)49}$	X $2\overline{)12}$
E $7\overline{)0}$	J $8\overline{)48}$	O $7\overline{)42}$	T $9\overline{)18}$	Y $9\overline{)36}$

2. Find the equation that has no solution. Find the equations that have many solutions. Solve the other equations.

A $9 \times 0 = n$	D $0 \times 0 = n$	G $36 \div n = 4$	J $0 \div 5 = n$
B $0 \div 8 = n$	E $0 \times n = 18$	H $n \times 0 = 0$	K $0 \times n = 0$
C $n \div 8 = 4$	F $9 \div 9 = n$	I $0 \times 5 = n$	L $28 \div 7 = n$

★ **3.** Find the quotients. Use whatever method you want.

A $52 \div 4 = n$
B $45 \div 3 = n$
C $46 \div 2 = n$
D $102 \div 6 = n$
E $112 \div 8 = n$
F $102 \div 3 = n$
G $112 \div 4 = n$
H $56 \div 2 = n$
I $144 \div 8 = n$

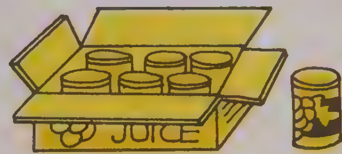


Solving Story Problems

AT THE GROCERY STORE

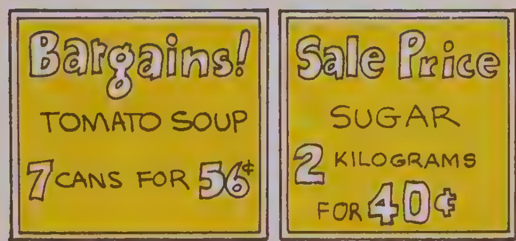
1. Jeff works at the supermarket after school. He put 32 cans of peaches on the shelf in 8 rows. How many cans were in each row?

2. Juice comes to the store packed in boxes. There are 6 cans in each box. How many boxes should be ordered to get 54 cans?



3. Jeff put 72 apples into 8 plastic bags. He put the same number in each bag. How many apples did he put in each bag?

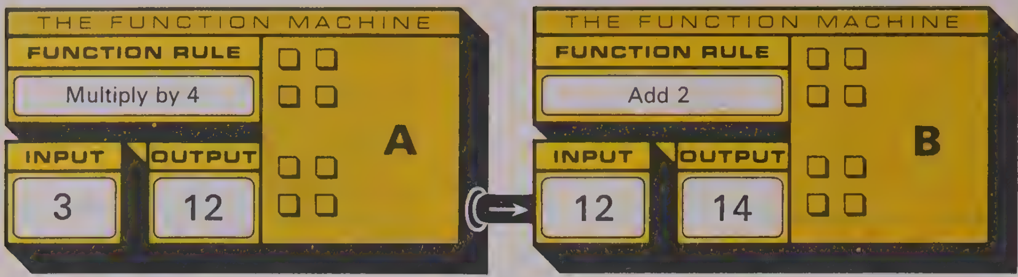
4. Jeff made these sale signs.
   A How much does 1 can of tomato soup cost?
   B How much does 1 kilogram of sugar cost?



5. Ted, Jeff's friend, came to the store. He had 45 cents. How many 5-cent candy bars could he buy?

6. A How much does one brand A frankfurter cost?
   B How much does one brand B frankfurter cost?
   ★ C Which would cost more: 3 packages of brand A or 4 packages of brand B?
   ★ D How many packages of brand A must you buy to serve one hot dog each to 56 people? How much will it cost?

The Function Machine



Function machine A is connected to function machine B. The output number from machine A becomes the input number for machine B. We put in 3. Machine A operates. Machine B operates. We get 14.

Think about connected function machines and give the numbers and words you think should go in the gray spaces.

1. RULE

A	Multiply by 2
B	Add 1

	Input A	Output B
	3	7
A	6	
B	9	
C	10	

2. RULE

A	Multiply by 8
B	Add 47

	Input A	Output B
A	4	
B	6	
C	7	
D	9	

3. RULE

A	Add 37
B	Subtract 37

	Input A	Output B
A	25	
B	88	
C	100	
D	0	

4. RULE

A	Multiply by 7
B	**A**

	Input A	Output B
	4	4
	9	9
B	6	
C	8	

★ **5.** RULE

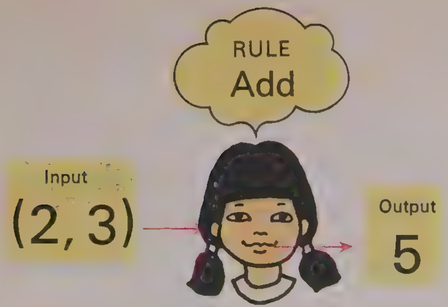
A	Add 8
B	**A**

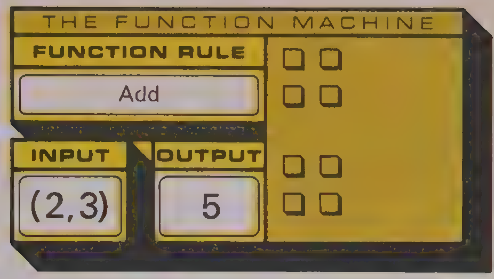
	Input A	Output B
	4	6
	6	7
B	2	
C	10	

★ **6.** RULE

A	**A**
B	Add 1

	Input A	Output B
	3	10
	5	26
B	4	
C	8	





In the following exercises, you put a pair of numbers into a function machine and get a single number. Give what you think should go in the gray spaces.

7. Function Rule: Multiply

	Input	Output
A	(3, 7)	
B	(4, 9)	
C	(9, 9)	
D	(7, 6)	
E	(9, ___)	45
F	(___, 8)	72

8. Function Rule: Divide

	Input	Output
	(12, 4)	3
A	(18, 2)	
B	(49, 7)	
C	(0, 3)	
D	(48, ___)	8
E	(___, 6)	9

9. Function Rule: Choose the greater

	Input	Output
	(39, 93)	93
	(107, 170)	170
A	(99, 999)	
B	(384, 834)	
C	(1005, 999)	
D	(617, 716)	

10. Function Rule: Double the first Then add

	Input	Output
	(3, 4)	10
	(9, 3)	21
A	(7, 8)	
B	(9, 18)	
C	(8, 94)	
D	(10, 10)	

11. Function Rule: A ___

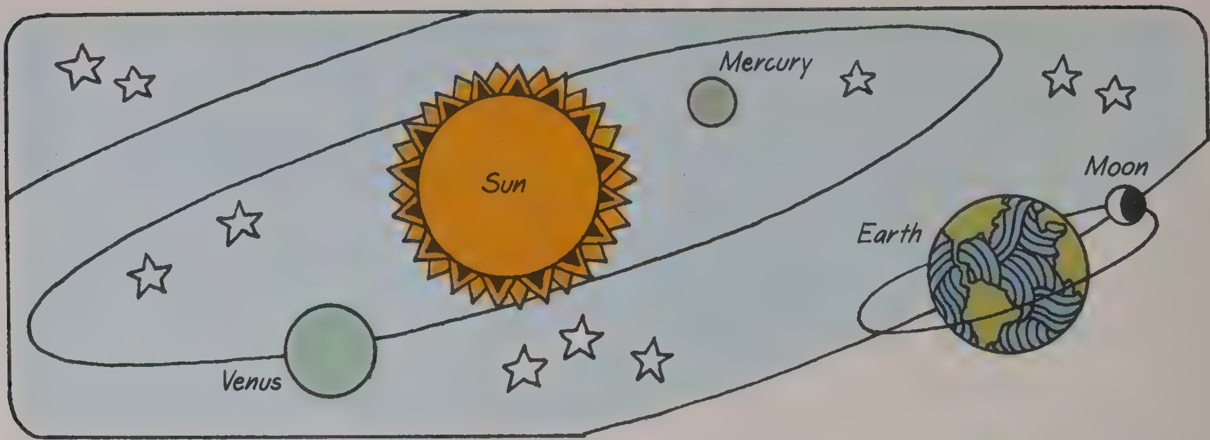
	Input	Output
	(6, 4)	10
	(9, 7)	16
	(14, 8)	22
B	(19, 8)	
C	(79, 67)	
D	(37, 63)	

★ **12.** Function Rule: A ___

	Input	Output
	(6, 4)	5
	(4, 10)	7
	(12, 8)	10
	(9, 9)	9
B	(7, 9)	
C	(4, 8)	

Solving Short Stories

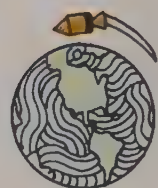
SPACE



1. Rocket to the moon. 63 kilometres in 9 seconds. How many kilometres per second ?

2. Closest distance to moon from Earth: 354 341 kilometres. Farthest distance: 404 336 kilometres. How much change in distance ?

3. Jupiter has 12 moons. Saturn: 10 moons. Uranus: 5 moons. Neptune: 2 moons. Mars: 2 moons. Earth: 1 moon. How many moons in all ?



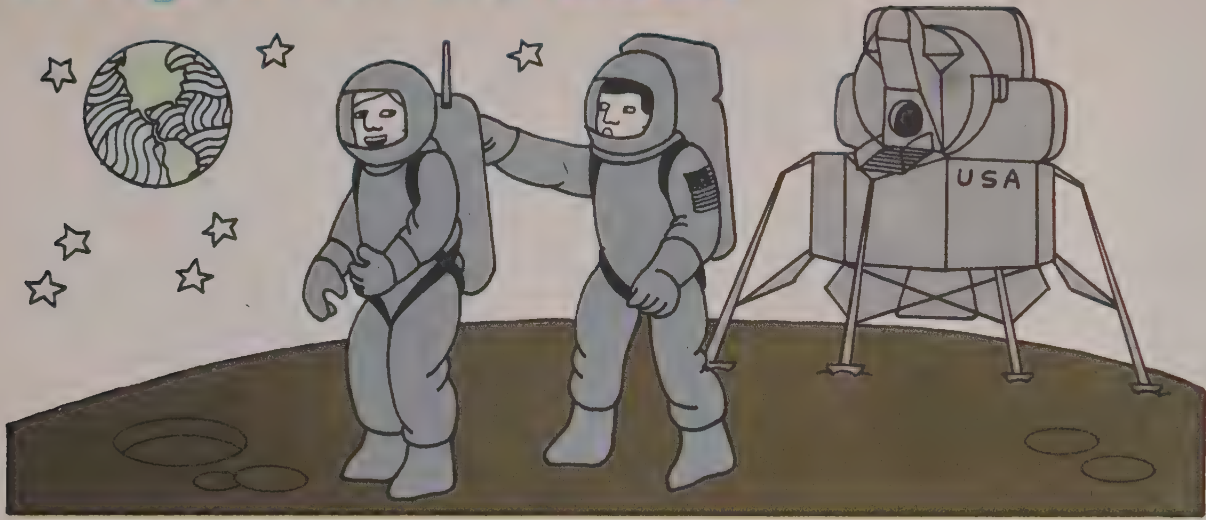
4. Rocket going into Earth orbit. Speed: 8 kilometres per second. How far in 8 seconds ?

5. Diameter of moon: 3456 kilometres. Diameter of Earth: 12 672 kilometres. How much greater is Earth's diameter ?

6. Weight. About 3 times as much on Earth as on Mars. Object weighs 27 kilograms on Earth. How much on Mars ?

★ 7. Weight. About 3 times as much on Earth as on Mercury. 18 kilograms on Mercury. How many kilograms on Earth ?

Weights on the Moon



Objects weigh 6 times as much on Earth as they do on the moon.

Name	Weight in kilograms	
	Moon	Earth
Jean	A	18
Kristin	B	24
Tom	4	C
John	3	D
Fred	E	30

Some children at Franklin School made this table to compare their Earth weights with their moon weights.

1. Complete the table by giving the weight that should go in each space.

2. Find the total moon weight of all the children.

3. Find the total Earth weight of all the children.

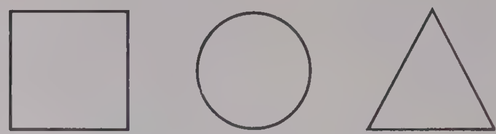
4. Bill's Earth weight is 24 kilograms. His dog has a moon weight of 2 kilograms. What is the total Earth weight of Bill and his dog ?

5. Karen's bicycle has a moon weight of 3 kilograms. Karen's Earth weight is 24 kilograms. On Earth, how much more does Karen weigh then her bicycle ?

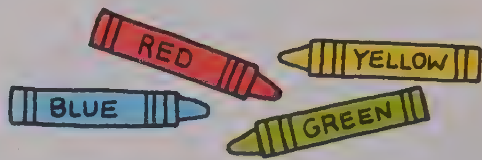
★6. If Eric weighs $3\frac{1}{2}$ kilograms on the moon, what does he weigh on Earth ?

Investigating the Ideas

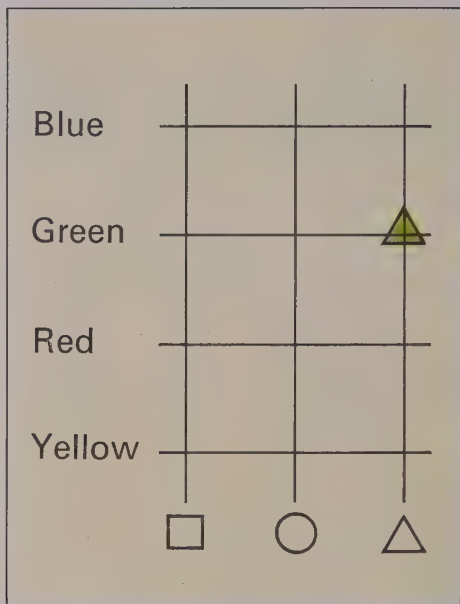
Use only these shapes →



and 4 different colors. →



Cut out and color (one color per figure) as many different figures as you can.



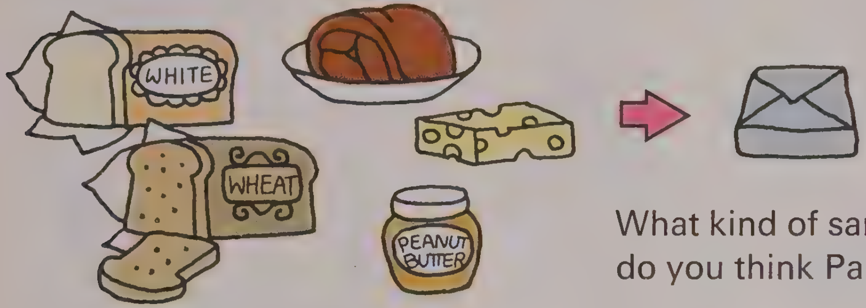
? Can you paste all your figures in their proper places on a graph like this one?

Discussing the Ideas

1. A Did you **pair** each figure with each color?
   B Did you get 4 rows of 3 on your graph?
   C Solve: $4 \times 3 = n$

2. How many different colored figures would you get with
   A 5 crayons? B 6 crayons? C 10 crayons?

1. Pam is making a sandwich. She plans to use white or brown bread (not both). She will use one of the following: beef, cheese, or peanut butter.



What kind of sandwich do you think Pam made?

A Which kind of bread would you choose?

B Which of the three would you put on your sandwich?

C Name all the different sandwiches that might be made.

D Solve the equation.

Number of kinds of bread	Number of things to put between the bread	Number of different sandwiches

$$\underset{\text{kinds of bread}}{2} \times \underset{\text{things to put between}}{3} = \underset{\text{different sandwiches}}{n}$$

2. Bill can have milk, soda, or cocoa. Bill can have a doughnut, cookie, roll, or cake. What do you think Bill ate and drank?

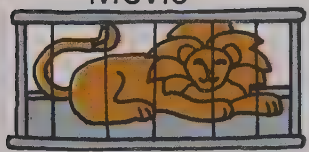
Bill

A Name all the different choices Bill might have made.
B How many choices are there?
C Solve: $3 \times 4 = n$

Pairing and multiplication

1. For his birthday, Jack gets to go to a movie, the zoo, or a ball game. He can go on any day of the week except Saturday or Sunday.

Movie



Zoo

Ball game

Monday

Tuesday

Wednesday

Thursday

Friday

? ?

Jack

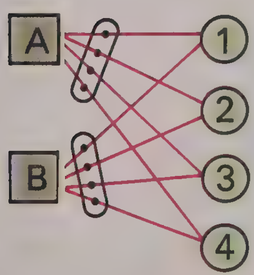
What do you think Jack will choose?

A Name all the choices (like the zoo on Tuesday) that Jack could make. How many choices are there?

B Solve: $3 \times 5 = n$

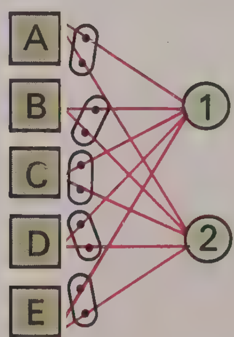
2. Write a multiplication equation for each picture. The small dots help you count the red lines that pair the squares with the circles.

Example:

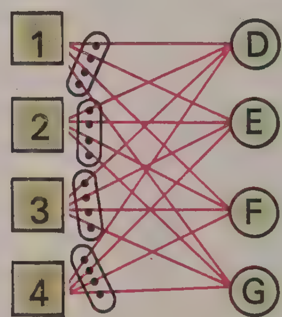


$2 \times 4 = 8$

A



B



1. A Here are 2 of the possible queen-king pairs.
   A, D (This is a short way of writing Ann and Don.)
   C, E (What does this represent?)
   B How many different queen-king pairs are there?
   C Write a multiplication equation that tells how many pairs.

2. The children decided that Betsy should be a princess and not the queen. Now list the possible queen-king pairs.

3. Earl had been reading about knights. He wanted very much to be a knight, so the children agreed. How many queen-king pairs were left?

4. Fred moved away before the play was presented. Who was the king?

5. Ann was not chosen to be the queen. Who was the queen?

★ 6. If 8 girls want to be queen and 7 boys want to be king, how many queen-king pairs would be possible?

Reviewing the Ideas

1. Find the products.

A	1×1	K	5×8
B	9×1	L	6×7
C	0×0	M	8×6
D	4×0	N	9×9
E	2×7	O	7×8
F	4×9	P	9×6
G	3×8	Q	9×8
H	8×3	R	7×9
I	9×4	S	9×10
J	4×8	T	10×10

think

Just for multiplication
I'm called the identity,
Since you get the other factor
When you multiply by me.

WHO AM I?

2. Find the quotients.

A	$24 \div 1$	E	$36 \div 6$	I	$42 \div 7$	M	$63 \div 9$	Q	$72 \div 8$
B	$0 \div 7$	F	$48 \div 8$	J	$49 \div 7$	N	$56 \div 8$	R	$81 \div 9$
C	$9 \div 9$	G	$48 \div 6$	K	$54 \div 6$	O	$64 \div 8$	S	$90 \div 9$
D	$27 \div 3$	H	$45 \div 9$	L	$63 \div 7$	P	$72 \div 9$	T	$100 \div 10$

3. Solve the equations to find the products.

A $12 \times 7 = (6 \times 7) + (6 \times 7) = n$ C $16 \times 7 = (8 \times 7) + (8 \times 7) = n$

B $13 \times 5 = (7 \times 5) + (6 \times 5) = n$ D $18 \times 8 = (9 \times 8) + (9 \times 8) = n$

4. Find the quotients.

A $5\overline{)25}$ B $6\overline{)54}$ C $7\overline{)42}$ D $9\overline{)54}$ E $9\overline{)0}$ F $7\overline{)56}$

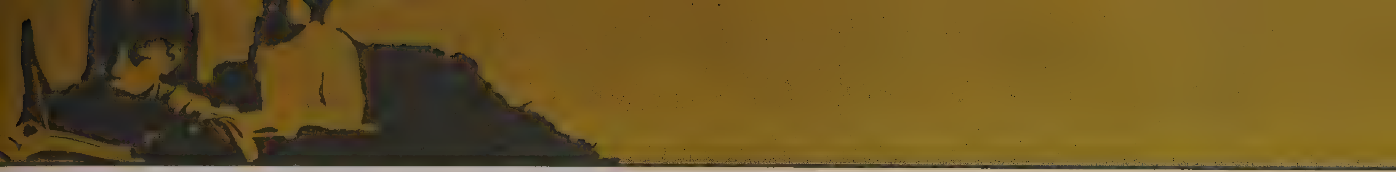
5. Give the missing numbers.

A Since $54 \times 398 = 21\,492$, we know that $398 \times 54 = n$.

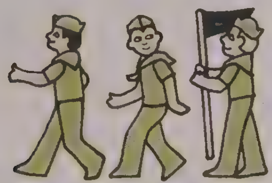
B Since $54 \times 398 = 21\,492$, we know that $21\,492 \div 398 = n$.

C Since $4672 + 4672 + 4672 = 14\,016$, we know that $3 \times 4672 = n$.

D Since $144 \div 48 = 3$, we know that $3 \times 48 = n$.

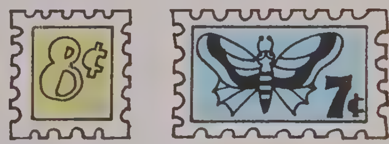


6. How many weeks are there in 49 days?



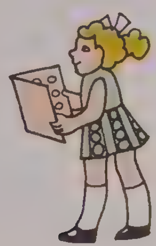
7. 32 Boy Scouts were divided into 4 patrols. There were the same number of scouts in each patrol. How many scouts were in each patrol?

8. How much does it cost to buy seven 8-cent stamps and one 7-cent stamp?



9. How many pennies can you get for 7 nickels and 3 dimes?

10. Tom had 8 bags with 8 marbles in each bag. He had 29 extra marbles on the ground. How many marbles did he have in all?



11. Sally put 9 coins on each of 7 pages in her coin-collection book. She had 77 other coins in a box. How many coins did she have in all?

★ 12. Ted had 35 rocks. Jim had 63 rocks. Each boy decided to store his rocks in cans, with 7 rocks in each can. Who used more cans? How many more?

★ 13. A Does $56 \div 8 = (56 \div 4) \div 2$? B Does $42 \div 6 = (42 \div 3) \div 2$?

Keeping in Touch with Addition, Subtraction, Multiplication, Division, Place value

1. Copy and find the sums.
   - A 538 + 24 + 365 + 4720
   - B 4768 + 232 + 5496
   - C 6437 + 35 + 932
   - D 375 + 893 + 5672 + 38

2. Find the sums and differences.

   A $\begin{array}{r} 4635 \\ +2819 \\ \hline \end{array}$ B $\begin{array}{r} 1386 \\ -539 \\ \hline \end{array}$ C $\begin{array}{r} 8207 \\ -3649 \\ \hline \end{array}$ D $\begin{array}{r} 5003 \\ -2216 \\ \hline \end{array}$ E $\begin{array}{r} 5739 \\ +8654 \\ \hline \end{array}$

3. Write the numeral for each exercise.
   - A five hundred thirty-seven
   - B nine hundred fifty
   - C seven hundred six
   - D four hundred nineteen
   - E eight thousand seven hundred
   - F one hundred sixty-six thousand
   - G six thousand thirty-seven
   - H ninety-eight thousand seventy

To find how many sets in all,
I'm surely your best bet.
Or use me if you need to give
The number in each set.

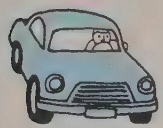
WHO AM I?

4. Give the next five numbers in each sequence.
   - A 1, 4, 9, 16, 25, . . .
   - B 1, 3, 5, 7, 9, . . .
   - C 1, 2, 4, 8, 16, . . .

5. A Add the first 2 numbers in exercise 4B. Which number in exercise 4A do you get?
   - B Add the first 4 odd numbers in exercise 4B. You should get 4 × 4.
   - C Add the first 6 odd numbers. Do you get 6 × 6?
   - D Add the first 7 odd numbers. Do you get 7 × 7?
   - E What do you think is the sum of the first 8 odd numbers?
   - F Find the sum of the first 9 odd numbers.
   - G Find the sum of the first 10 odd numbers.

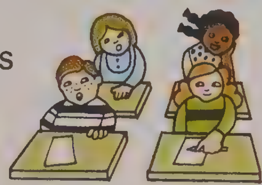
6. No numbers are given in this exercise. Decide whether you would add, subtract, multiply, or divide if numbers were given. Answer **A, S, M,** or **D.**

A Joe had ||||| baseball cards.
Bill had ||||| baseball cards.
How many more baseball cards did Bill have than Joe?



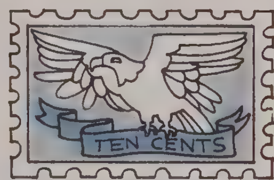
B We drove ||||| kilometres on Friday and ||||| kilometres on Saturday. How far did we drive altogether?

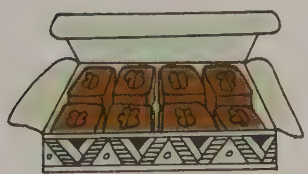
C In Jane's classroom there were ||||| rows with ||||| children in each row.
How many children?



D Ted had ||||| hamsters. He gave ||||| away.
How many did he have left?

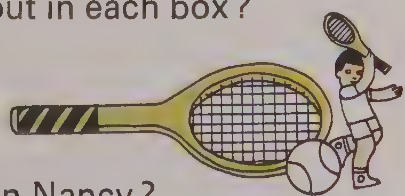
E Emily had ||||| stamps in her collection. She had ||||| stamps on each page. How many pages of stamps did she have?

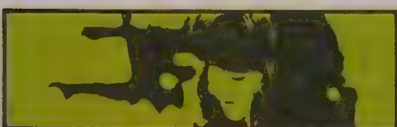




F Sandy made ||||| pieces of fudge. She put the same number of pieces in each of ||||| boxes. How many pieces did she put in each box?

7. Nancy's tennis racket cost $9.99.
Ken spent $18.45 for his racket.
How much more did Ken spend than Nancy?





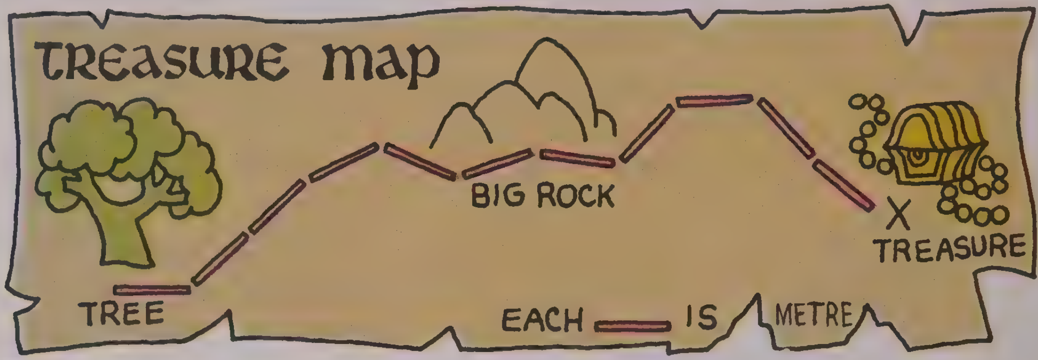
You are invited to explore

ACTIVITY CARD 6
Page 350

6 Special Products and Quotients

Let's explore 10, 100, and 1000 as factors.

Investigating the Ideas



? Can you find the distance from the tree to the treasure if the missing number on the map is
A 1? B 10? C 100? D 1000?

Discussing the Ideas

1. Solve the equations.
   A $14 \times 1 = n$
   B $14 \times 10 = n$
   C $14 \times 100 = n$
   D $14 \times 1000 = n$

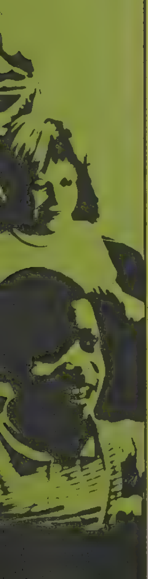
2. Continue the skip-counting for 20 more numbers.
   A 10, 20, 30, 40, 50, . . .
   B 100, 200, 300, 400, 500, . . .
   C 1000, 2000, 3000, 4000, 5000, . . .

3. Study this rule. Can you give a similar rule for finding the product of a number and 10?

   To write the **product** of a number and 100 just write this number in the **hundreds' place.**

HUNDREDS	HUNDREDS
$6 \times 100 = 600$	$87 \times 100 = 8700$

4. Can you think of a rule of your own for multiplying by 10, 100, or 1000?



1. How many cents?

A 1 dime C 7 dimes E 28 dimes G 124 dimes

B 2 dimes D 12 dimes F 75 dimes H 526 dimes

2. How many cents?

A 1 dollar C 7 dollars E 28 dollars G 124 dollars

B 2 dollars D 12 dollars F 75 dollars H 526 dollars

3. Find the products.

A 5×10 G 12×100 M 5×100 S 15×1000

B 17×10 H 24×100 N 17×1000 T 30×1000

C 12×10 I 32×10 O 12×1000 U 40×100

D 18×10 J 32×100 P 18×1000 V 40×10

E 5×100 K 48×10 Q 15×10 W 40×1000

F 17×100 L 48×100 R 15×100 X 70×100

4. Each metre is 100 centimetres. How many centimetres in

A 5 metres? B 14 metres? C 50 metres? D 100 metres?

★ **5.** Solve the equations.

A $7 \times n = 7$

B $7 \times n = 70$

C $7 \times n = 700$

D $7 \times n = 7000$

E $6 \times n = 600$

F $18 \times 100 = n$

G $14 \times n = 14\,000$

H $n \times 100 = 900$

I $n \times 1000 = 15\,000$

J $23 \times n = 2300$

K $79 \times n = 790$

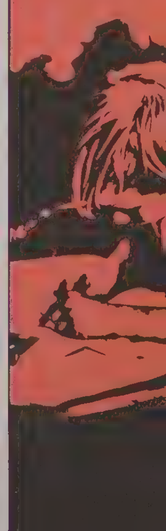
L $79 \times n = 7900$

M $n \times 1000 = 51\,000$

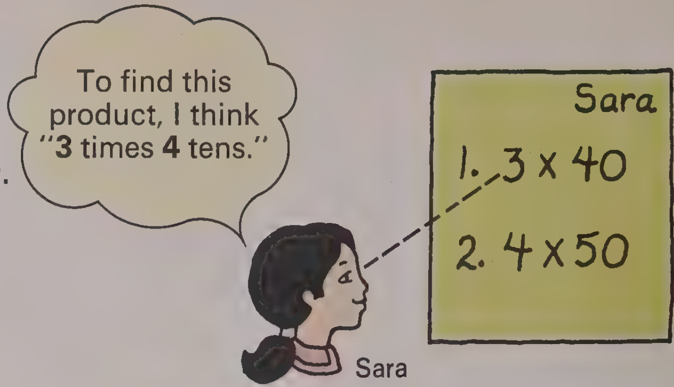
think

To multiply by me
Is as easy as can be.
That it's hard, I'll not pretend.
Just put zero on the end.

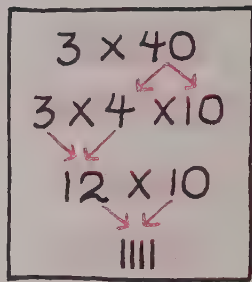
WHO AM I?



Discussing the Ideas



1. A Explain how Sara is thinking about the product 3×40.
   B How would Sara think about the product 4×50?



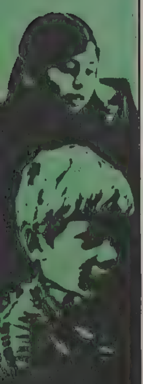
2. The diagram shows how Sara is using the **grouping principle** to complete the problem. Find the final product.

3. In each exercise, explain why the two products are the same. Find the products.

A 3×50	B 4×60	C 5×300	D 4×600	E 6×3000
15×10	24×10	15×100	24×100	18×1000

4. Solve the equations.

A $3 \times 20 = 3 \times 2 \times 10 = n$
B $5 \times 30 = 5 \times 3 \times 10 = n$
C $8 \times 40 = 8 \times 4 \times 10 = n$
D $9 \times 50 = 9 \times 5 \times 10 = n$
E $7 \times 60 = 7 \times 6 \times 10 = n$
F $4 \times 70 = 4 \times 7 \times 10 = n$
G $7 \times 80 = 7 \times 8 \times 10 = n$
H $6 \times 90 = 6 \times 9 \times 10 = n$
I $5 \times 70 = 5 \times 7 \times 10 = n$
J $9 \times 70 = 9 \times 7 \times 10 = n$
K $6 \times 40 = 6 \times 4 \times 10 = n$
L $5 \times 60 = 5 \times 6 \times 10 = n$
M $9 \times 80 = 9 \times 8 \times 10 = n$
N $8 \times 90 = 8 \times 9 \times 10 = n$
O $6 \times 80 = 6 \times 8 \times 10 = n$
P $9 \times 60 = 9 \times 6 \times 10 = n$
Q $3 \times 400 = 3 \times 4 \times 100 = n$
R $8 \times 600 = 8 \times 6 \times 100 = n$
S $5 \times 700 = 5 \times 7 \times 100 = n$
T $9 \times 8000 = 9 \times 8 \times 1000 = n$



1. Find the products.

A 3×6
B 3×60
C 5×3
D 5×30
E 5×300
F 4×5
G 4×50
H 5×7
I 5×70
J 5×700
K 6×4
L 6×40
M 3×8
N 3×80
O 3×800
P 7×8
Q 7×80
R 9×3
S 9×30
T 9×300
U 8×5
V 8×50
W 9×7
X 9×70
Y 9×700

2. Find the products.

A 4×30
B 5×60
C 7×70
D 6×80
E 9×50
F 3×70
G 8×70
H 6×90
I 4×40
J 6×60
K 7×90
L 9×90
M 4×200
N 6×600
O 8×800
P 9×700
Q 7×600
R 5×500
S 3×900
T 8×500

3. Find the products.

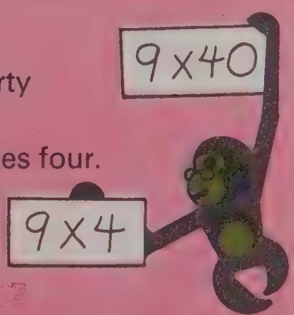
A 7×50
B 3×900
C 6×300
D 4×900
E 7×600
F 9×800
G 8×200
H 2×900
I 9×700
J 400×5
K 700×7
L 600×9
M 7000×4
N 4000×8
O 5000×6
P 9000×7

★ **4.** Solve the equations.

A $6 \times 90 = n$
B $n \times 80 = 320$
C $n \times 70 = 350$
D $n \times 9 = 630$
E $n \times 8 = 560$
F $n \times 5 = 400$
G $30 \times n = 180$
H $n = 7 \times 80$
I $6 \times n = 420$
J $n \times 40 = 360$
K $630 = n \times 70$
L $540 = 6 \times n$
M $n \times 800 = 3200$
N $n \times 900 = 6300$
O $9 \times n = 5400$
P $600 \times n = 4200$
Q $7200 = 8 \times n$
R $n \times 500 = 4500$
S $9 \times n = 8100$

think

Finding nine times forty
Is simple as can be.
You first find nine times four.
Then multiply by me.

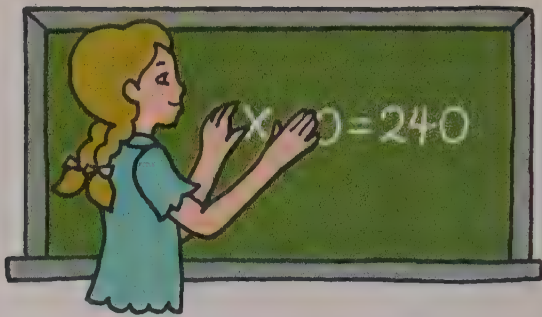


WHO AM I?

More practice, page A-14, Set 24

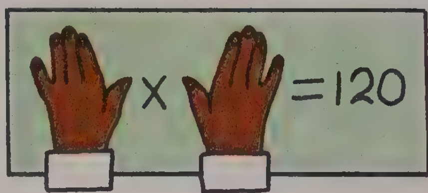
Investigating the Ideas

Note that one factor in Susan's equation ends in 0.

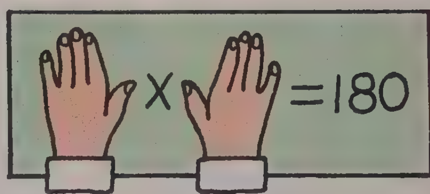


? Can you write all the equations Susan might be hiding?

Discussing the Ideas



1. Suppose one of the factors ends in 0. Give possible pairs of factors that might be hidden.



2. Can you find an easy shortcut for finding these pairs of factors?

3. Practice with special products will help you find missing factors. Give the products.

A 8 × 10	E 50 × 8	I 47 × 10	M 10 × 96
B 13 × 10	F 60 × 10	J 10 × 65	N 0 × 10
C 60 × 9	G 9 × 80	K 10 × 93	O 831 × 10
D 10 × 10	H 100 × 10	L 132 × 10	P 10 × 729

4. Find the products.

A 20 × 9	E 7 × 90	I 9 × 400	M 6 × 70
B 5 × 30	F 21 × 10	J 80 × 4	N 30 × 9
C 4 × 70	G 3 × 700	K 34 × 10	O 4 × 500
D 10 × 35	H 6 × 500	L 8 × 700	P 6 × 60

1. Solve the equations.

A $n \times 3 = 21$
B $n \times 3 = 210$
C $n \times 7 = 28$
D $n \times 7 = 280$
E $n \times 5 = 30$
F $n \times 5 = 300$
G $n \times 4 = 24$
H $n \times 4 = 240$
I $n \times 4 = 2400$
J $n \times 6 = 42$
K $n \times 6 = 420$
L $n \times 6 = 4200$
M $n \times 6 = 54$
N $n \times 6 = 540$
O $n \times 6 = 5400$
P $n \times 9 = 18$
Q $n \times 9 = 180$
R $n \times 9 = 1800$

2. Solve the equations.

A $n \times 3 = 240$
B $n \times 6 = 360$
C $n \times 2 = 160$
D $n \times 5 = 200$
E $n \times 7 = 210$
F $n \times 4 = 320$
G $n \times 8 = 400$
H $n \times 2 = 60$
I $n \times 4 = 120$
J $n \times 9 = 270$
K $n \times 5 = 450$
L $n \times 7 = 420$
M $n \times 3 = 2400$
N $n \times 4 = 2800$
O $n \times 2 = 1600$
P $n \times 5 = 2000$
Q $n \times 7 = 4900$
R $n \times 6 = 3000$

3. Solve the equations.

A $n \times 3 = 24$
B $n \times 30 = 240$
C $n \times 5 = 20$
D $n \times 50 = 200$
E $n \times 4 = 32$
F $n \times 40 = 320$
G $n \times 2 = 16$
H $n \times 20 = 160$
I $n \times 200 = 1600$
J $n \times 4 = 28$
K $n \times 40 = 280$
L $n \times 40 = 2800$

think

Maria baked less than 2 dozen cookies. When she tried to divide them equally among 2, 3, or 4 of her friends, there was always 1 cookie left over. How many cookies did she bake ?

More practice, page A-14, Set 25

Let's explore special quotients.

1. Solve the equations.

A $a \times 4 = 12 \longrightarrow b \times 4 = 120 \longrightarrow 120 \div 4 = c$

B $a \times 6 = 18 \longrightarrow b \times 6 = 180 \longrightarrow 180 \div 6 = c$

C $a \times 5 = 25 \longrightarrow b \times 5 = 250 \longrightarrow 250 \div 5 = c$

D $a \times 8 = 16 \longrightarrow b \times 8 = 160 \longrightarrow 160 \div 8 = c$

E $a \times 3 = 27 \longrightarrow b \times 3 = 270 \longrightarrow 270 \div 3 = c$

F $a \times 2 = 10 \longrightarrow b \times 2 = 100 \longrightarrow 100 \div 2 = c$

2. Solve the equations.

A $n \times 7 = 14$
B $n \times 7 = 140$
C $140 \div 7 = n$
D $n \times 4 = 32$
E $n \times 4 = 320$
F $320 \div 4 = n$
G $n \times 8 = 24$
H $n \times 8 = 240$
I $240 \div 8 = n$
J $n \times 7 = 28$
K $n \times 7 = 280$
L $280 \div 7 = n$
M $n \times 9 = 27$
N $n \times 9 = 270$
O $270 \div 9 = n$
P $n \times 6 = 24$
Q $n \times 6 = 240$
R $240 \div 6 = n$

3. Find the quotients.

A $21 \div 3 = n$
B $210 \div 3 = n$
C $14 \div 7 = n$
D $140 \div 7 = n$
E $24 \div 4 = n$
F $240 \div 4 = n$
G $40 \div 5 = n$
H $400 \div 5 = n$
I $48 \div 8 = n$
J $480 \div 8 = n$
K $36 \div 6 = n$
L $360 \div 6 = n$
M $27 \div 9 = n$
N $270 \div 9 = n$
O $49 \div 7 = n$
P $490 \div 7 = n$
Q $56 \div 8 = n$
R $560 \div 8 = n$

4. Find the quotients.

A $20 \div 5 = n$
B $200 \div 50 = n$
C $28 \div 4 = n$
D $280 \div 40 = n$
E $32 \div 8 = n$
F $320 \div 80 = n$
G $48 \div 6 = n$
H $480 \div 60 = n$
I $72 \div 9 = n$
J $720 \div 90 = n$
K $42 \div 6 = n$
L $420 \div 60 = n$

5. Find the quotients. Think about the missing factors.

A $320 \div 8 = n$	G $360 \div 9 = n$	M $210 \div 3 = n$	S $120 \div 20 = n$
B $270 \div 3 = n$	H $180 \div 2 = n$	N $560 \div 7 = n$	T $150 \div 30 = n$
C $350 \div 5 = n$	I $480 \div 8 = n$	O $630 \div 9 = n$	U $360 \div 40 = n$
D $240 \div 4 = n$	J $420 \div 6 = n$	P $720 \div 8 = n$	V $480 \div 60 = n$
E $300 \div 6 = n$	K $280 \div 4 = n$	Q $490 \div 7 = n$	W $560 \div 70 = n$
F $420 \div 7 = n$	L $450 \div 5 = n$	R $540 \div 6 = n$	X $810 \div 90 = n$

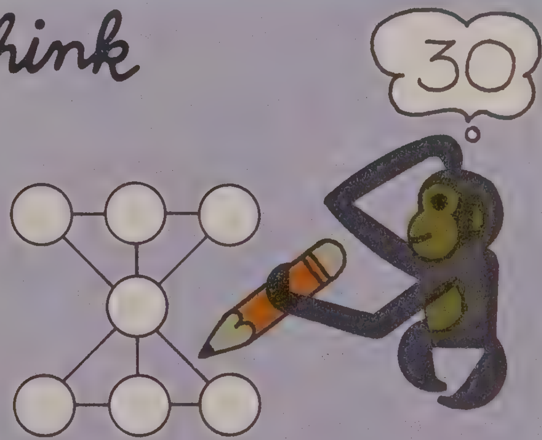
6. Find the quotients. Think about the missing factors.

A $3\overline{)120}$	E $2\overline{)160}$	I $9\overline{)630}$	M $9\overline{)720}$	Q $50\overline{)300}$
B $5\overline{)200}$	F $8\overline{)400}$	J $8\overline{)640}$	N $6\overline{)540}$	R $60\overline{)480}$
C $6\overline{)180}$	G $9\overline{)360}$	K $8\overline{)560}$	O $30\overline{)270}$	S $70\overline{)490}$
D $7\overline{)210}$	H $4\overline{)320}$	L $7\overline{)420}$	P $40\overline{)200}$	T $90\overline{)540}$

7. Find the quotients.

A $4\overline{)1600}$	K $3\overline{)2400}$
B $5\overline{)2000}$	L $6\overline{)3000}$
C $9\overline{)1800}$	M $9\overline{)6300}$
D $3\overline{)2700}$	N $4\overline{)2800}$
E $7\overline{)5600}$	O $6\overline{)5400}$
F $8\overline{)4800}$	P $7\overline{)2800}$
G $9\overline{)5400}$	Q $8\overline{)7200}$
H $7\overline{)4200}$	R $9\overline{)8100}$
I $3\overline{)2100}$	S $7\overline{)6300}$
J $5\overline{)4000}$	T $8\overline{)6400}$

think



Draw a figure like this one. Put the numbers 7, 8, 9, 10, 11, 12, and 13 in the circles so that the sum of the numbers along any line is 30.

More practice, page A-15, Set 26

Investigating the Ideas

Study the steps in Carol's notebook.

		Carol
		30×40
Clue 1	$30 = 3 \times 10$ $40 = 4 \times 10$	$3 \times 10 \times 4 \times 10$
Clue 2	Rearrange	$3 \times 4 \times 10 \times 10$
Clue 3	Multiply	12×100

? Can you show the same steps as Carol's for finding 40×60?

Discussing the Ideas

1. Explain the steps and solve the equations.

   A $40 \times 60 = 4 \times 10 \times 6 \times 10 = n$
   B $50 \times 60 = 5 \times 10 \times 6 \times 10 = n$
   C $60 \times 70 = 6 \times 10 \times 7 \times 10 = n$
   D $70 \times 80 = 7 \times 10 \times 8 \times 10 = n$

2. Can you give a simple rule for finding 30×40?

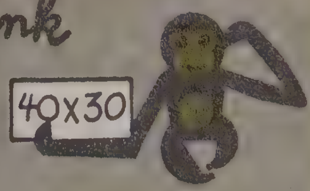
3. Try your rule out on these products.

A 20×60	D 40×20	G 20×70	J 90×20
B 30×30	E 60×10	H 50×50	K 80×90
C 30×20	F 50×30	I 60×30	L 70×80

1. Find the products.

A $30 \times 60 = n$
B $80 \times 40 = n$
C $90 \times 30 = n$
D $70 \times 40 = n$
E $70 \times 90 = n$
F $40 \times 60 = n$
G $70 \times 30 = n$
H $40 \times 90 = n$
I $80 \times 70 = n$
J $60 \times 80 = n$
K $40 \times 40 = n$
L $80 \times 90 = n$
M $60 \times 90 = n$
N $90 \times 90 = n$
O $70 \times 70 = n$
P $60 \times 50 = n$

think



To find 40 times 30
Much quicker than quick,
Just find me times 100.
There's really no trick.

WHO AM I?

2. Find the quotient by solving the multiplication equation.

A $n \times 40 = 800$; $800 \div 40 = n$
B $n \times 30 = 900$; $900 \div 30 = n$
C $n \times 50 = 1500$; $1500 \div 50 = n$
D $n \times 30 = 2700$; $2700 \div 30 = n$
E $n \times 70 = 3500$; $3500 \div 70 = n$
F $n \times 60 = 2400$; $2400 \div 60 = n$
G $n \times 90 = 6300$; $6300 \div 90 = n$
H $n \times 60 = 1800$; $1800 \div 60 = n$
I $n \times 80 = 4800$; $4800 \div 80 = n$

3. Find the quotients. Think about missing factors.

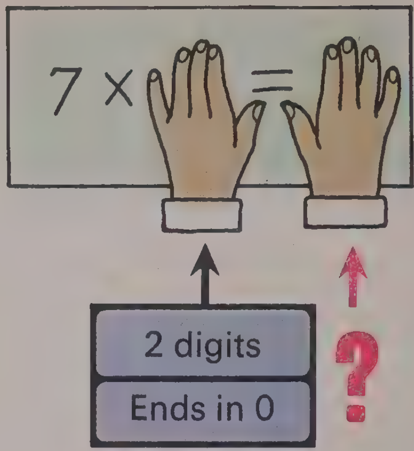
A $40\overline{)1200}$
B $20\overline{)1400}$
C $50\overline{)2500}$
D $10\overline{)900}$
E $30\overline{)2100}$
F $60\overline{)1800}$
G $70\overline{)4200}$
H $30\overline{)2700}$
I $10\overline{)800}$
J $80\overline{)800}$
K $20\overline{)1800}$
L $40\overline{)3200}$
M $50\overline{)4000}$
N $60\overline{)3000}$
O $40\overline{)3600}$
P $80\overline{)5600}$
Q $10\overline{)400}$
R $90\overline{)6300}$
S $10\overline{)500}$
T $90\overline{)2700}$

4. Find the products.

A $20 \times 700 = n$
B $40 \times 400 = n$
C $30 \times 800 = n$
D $60 \times 300 = n$
E $50 \times 900 = n$
F $70 \times 900 = n$
G $70 \times 800 = n$
H $80 \times 800 = n$
I $90 \times 800 = n$

More practice, page A-15, Set 27

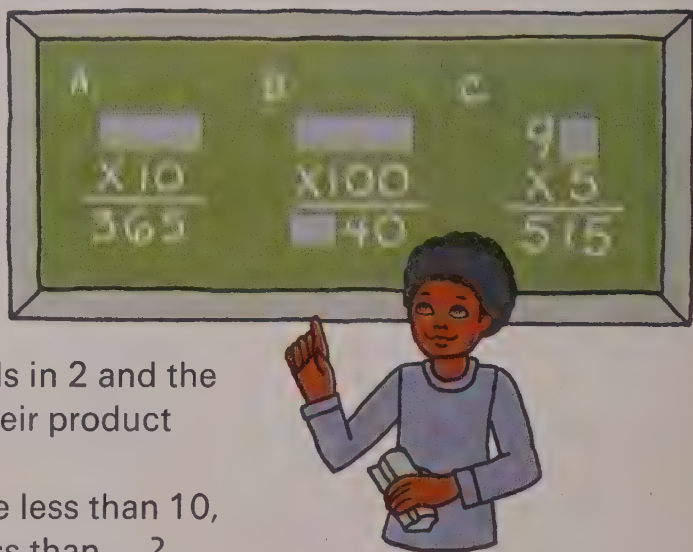
Investigating the Ideas



Suppose you know two things about one of the factors.

> **?** How many different things can you tell about the product?

Discussing the Ideas



1. Explain the mistake in each problem.

2. Give the missing words and explain your answers.

   A If one number ends in 2 and the other ends in 5, their product ends in __?__.

   B If two numbers are less than 10, their product is less than __?__.

   C If two numbers are odd, their product is __?__.

   ★ D If the product of two whole numbers is less than one of the numbers, then one of the numbers is __?__.

Copy each problem. Give the missing digits.

	A	B	C	D	E	F
	50	□0	□0	9□	□□	□□
	× 1□	× 10	× 9	× □	× 7	× 9
	500	700	36□	540	5□0	6□0

A store manager bought 9 coats. Some of the coats cost \$40 and the others cost \$80.

A The total cost of the coats could not have been \$720. Why?

B The total cost of the coats could not have been \$360. Why?

C What is the most he could have paid for the coats?

D What is the least he could have paid for the coats?

E If 4 coats cost \$80 each and 5 cost \$40 each, how much did he pay for all the coats?

★ F If the total cost of the coats was \$440, how many \$40 coats did he buy?

Give the pairs of numbers that go in the gray spaces.

	Products	×		+	Sums
A	50				15
B	140				27
C	140				72
D	560				87
E	4200				706
F	3600				904

	Products	×		÷	Quotients
G	100				1
H	250				10
I	160				10
J	300				3
K	1000				10
L	2400				24

Reviewing the Ideas

1. Find the products.

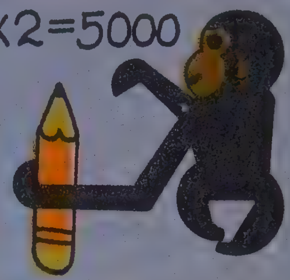
A 10×7	G 6×100
B 18×10	H 100×18
C 10×23	I 57×100
D 50×10	J 70×100
E 75×10	K 100×32
F 10×83	L 86×100

think

ME X ME X 2 = 5000

Multiply me by myself.
Then multiply by 2.
5000 is the answer.
You need no other clue.

WHO AM I?



2. Give the missing numbers.
   A Since $3 \times 2 = 6$, we know that $3 \times 20 = n$.
   B Since $7 \times 4 = 28$, we know that $7 \times 40 = n$.
   C Since $9 \times 6 = 54$, we know that $9 \times 600 = n$.
   D Since $3 \times 10 \times 4 \times 10 = 12 \times 100$, we know that $30 \times 40 = n$.
   E Since $8 \times 10 \times 9 \times 10 = 72 \times 100$, we know that $80 \times 90 = n$.

3. Find the products.

A 4×30	F 7×200	K 70×20	P 7×90
B 5×70	G 3×500	L 30×40	Q 800×2
C 6×80	H 600×4	M 50×60	R 70×50
D 40×4	I 8×300	N 80×40	S 6×700
E 50×6	J 400×8	O 30×90	T 90×90

4. Find the quotients.

A $120 \div 4$	D $2500 \div 5$	G $2400 \div 30$	J $3500 \div 70$
B $240 \div 6$	E $2100 \div 7$	H $1600 \div 20$	K $4200 \div 60$
C $180 \div 2$	F $2400 \div 8$	I $2000 \div 40$	L $4500 \div 50$

5. Find the quotients.

A $4\overline{)280}$	C $9\overline{)270}$	E $8\overline{)1600}$	G $60\overline{)600}$	I $5\overline{)4000}$
B $5\overline{)100}$	D $6\overline{)540}$	F $40\overline{)280}$	H $20\overline{)140}$	J $70\overline{)630}$

Keeping in Touch with Basic principles

1. The equations below illustrate the order, grouping, and zero principles for addition. Write the corresponding equations for multiplication.

ORDER $\longrightarrow$ $5 + 7 = 7 + 5$

GROUPING $\longrightarrow$ $5 + (7 + 6) = (5 + 7) + 6$

ZERO $\longrightarrow$ $5 + 0 = 5$

2. Each exercise illustrates a basic principle.
Name the principle used in each exercise.

A $30 \times (2 \times 10) = (30 \times 2) \times 10$
B $54 + 37 = 37 + 54$
C $93 + 0 = 93$
D $87 \times 0 = 0 \times 87$
E $63 \times 1 = 63$
F $30 + (10 + 2) = (30 + 10) + 2$

3. Using the multiplication-addition principle, give the number for each $\square$.

A $23 \times 10 = (20 \times 10) + (\square \times 10)$
B $(30 \times 5) + (4 \times 5) = 34 \times \square$
C $67 \times 4 = (\square \times 4) + (7 \times 4)$
D $86 \times \square = (80 \times 7) + (6 \times 7)$

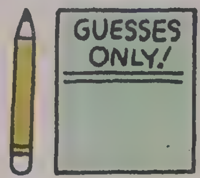
★ **4.** Name the principle used in each exercise.

A $(3 \times 2) \times (5 \times 4) = (5 \times 4) \times (3 \times 2)$
B $(6 \times 7) + (4 \times 7) = (4 \times 7) + (6 \times 7)$
C $(20 \times 8) + (3 \times 8) = 23 \times 8$
D $(25 + 7) + 3 = 3 + (25 + 7)$
E $(8 + 5) + (4 + 7) = (4 + 7) + (8 + 5)$
F $(5 + 9) + (6 + 8) = (9 + 5) + (8 + 6)$

7 Estimation

What does it mean to estimate?

Investigating the Ideas



No pencil and paper
(except to record your guesses)

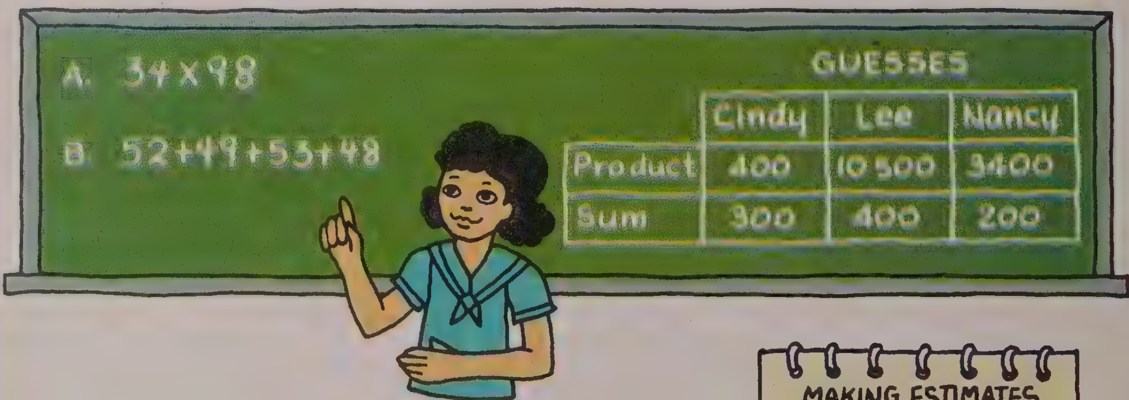
72 × 987
7056 + 4987

? How close can you come to guessing this product and sum?

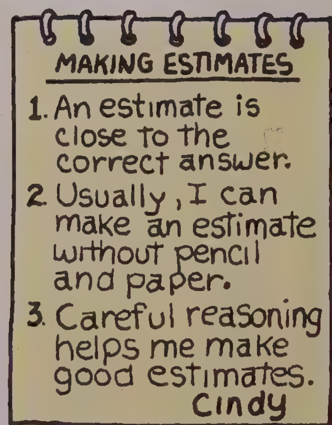
Discussing the Ideas

1. Which guess do you think is best for the product? Why?

2. Which guess is best for the sum? Why?

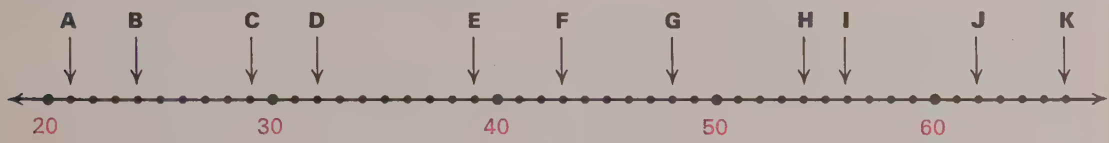


3. We will use the word **estimate** instead of **guess**. Can you add anything about estimates to Cindy's notebook?



Using the Ideas

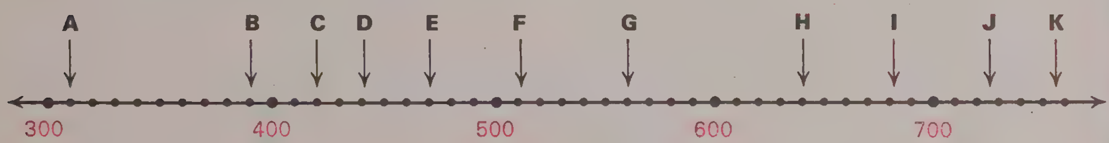
1. Multiples of 10 and 100 are helpful in making estimates.
To estimate 29×43, we can find the product 30×40.
To estimate $48 + 73$, we can find the sum $50 + 70$.
To estimate 312×67, we can find the product 300×70.
To estimate $687 + 218$, we can find the sum $700 + 200$.
The number-line pictures and the exercises will help you choose multiples of 10 and 100 to use in estimating.
Give the numbers (A through K) that go with the points on this number-line picture.



2. Give the multiple of 10 that is closest to each number in exercise 1. The number-line picture should help you.

3. Give the multiple of 10 that is closest to each number.
A 31 B 42 C 53 D 64 E 26 F 37 G 48 H 59

4. Here are the numbers for A and B: A 310 B 390.
Give the numbers for C through K.



5. Give the multiple of 100 that is closest to each number in exercise 4.

6. Give the multiple of 100 that is closest to each number.
A 320 B 590 C 499 D 619 E 735 F 549 G 551

Let's explore estimates of sums and differences.

1. $\begin{array}{r} 79 \\ +49 \\ \hline \end{array}$

A Which of these do you think will give the best estimate of the sum in color?

$\boxed{A}$ $\begin{array}{r} 70 \\ +40 \\ \hline \end{array}$ $\boxed{B}$ $\begin{array}{r} 80 \\ +40 \\ \hline \end{array}$ $\boxed{C}$ $\begin{array}{r} 80 \\ +50 \\ \hline \end{array}$

B Check your estimate by finding the correct sum.

2. $\begin{array}{r} 151 \\ -89 \\ \hline \end{array}$

A Which of these do you think will give the best estimate of the difference in color?

$\boxed{A}$ $\begin{array}{r} 160 \\ -80 \\ \hline \end{array}$ $\boxed{B}$ $\begin{array}{r} 150 \\ -90 \\ \hline \end{array}$ $\boxed{C}$ $\begin{array}{r} 160 \\ -90 \\ \hline \end{array}$

B Check your estimate by finding the correct difference.

3. Give the multiples of 10 that are closest to the addends. Then give an estimate for the sum.

Example: $\begin{array}{rcr} 58 & \rightarrow & 60 \\ +96 & \rightarrow & 100 \\ \hline \text{Estimate} & \rightarrow & 160 \end{array}$

A $\begin{array}{rcr} 19 & \rightarrow & ▯ \\ +48 & \rightarrow & ▯ \\ \hline & & ▯ \end{array}$ B $\begin{array}{rcr} 23 & \rightarrow & ▯ \\ +78 & \rightarrow & ▯ \\ \hline & & ▯ \end{array}$ C $\begin{array}{rcr} 27 & \rightarrow & ▯ \\ +69 & \rightarrow & ▯ \\ \hline & & ▯ \end{array}$

4. Give the number you think should go in each ▯.

A To estimate 98 + 49, we can find the sum ▯ + 50.
B To estimate 79 + 19, we can find the sum 80 + ▯.
C To estimate 92 − 47, we can find the difference ▯ − 50.
D To estimate 12 + 87, we can find the sum ▯ + 90.
E To estimate 67 + 34, we can find the sum 70 + ▯.
F To estimate 53 − 38, we can find the difference 50 − ▯.

5. Give an estimate for each sum and difference.

A 59 + 19	E 69 + 69	I 44 + 86	M 12 + 23 + 29
B 92 − 48	F 93 − 27	J 97 − 46	N 58 + 63 + 47
C 43 + 69	G 86 + 59	K 97 + 98	O 69 + 46 + 44
D 67 − 27	H 87 − 28	L 77 − 38	P 86 + 84 + 98

6. Give the multiples of 100 that are closest to the addends. Then give an estimate for the sum.

A	B	C	D
898 → ▒	690 → ▒	457 → ▒	651 → ▒
407 → ▒	418 → ▒	541 → ▒	849 → ▒
296 → ▒	387 → ▒	327 → ▒	378 → ▒
+513 → ▒	+209 → ▒	+273 → ▒	+764 → ▒
▒	▒	▒	▒

7. Find the correct sums in exercise 4. Which was your best estimate?

8. Give the number you think should go in each ▒.

A To estimate 298 + 67, we can find the sum ▒ + 70.
B To estimate 702 − 397, we can find the difference ▒ − 400.
C To estimate 417 + 686, we can find the sum 400 + ▒.
D To estimate 641 + 856, we can find the sum ▒ + 900.
E To estimate 847 − 568, we can find the difference ▒ − 600.

9. Which sum will give the best estimate for 85 + 85?

A 80 + 80 B 90 + 90 C 80 + 90

10. Give an estimate for each sum.

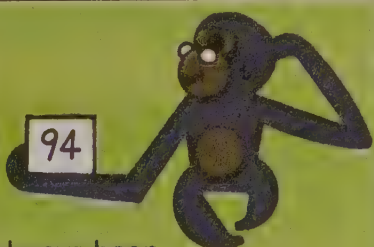
A 85 + 65 B 35 + 45 C 65 + 65 D 75 + 45

11. Give an estimate for each sum and difference.

A 395 + 407 I 88 + 317
B 402 − 198 J 761 − 458
C 787 + 218 K 869 + 468
D 479 − 324 L 729 − 346
E 963 + 439 M 301 + 649
F 804 − 387 N 649 − 301
G 497 + 69 O 489 − 92
H 886 − 39 P 86 + 215

think

80+5 ▒ 94



I have always been
A two-digit multiple of 10.
I am closer to 94
Than to 80 and 5 more.
WHO AM I?

Investigating the Ideas

Jack made 4 mistakes on his paper.

Jack

1. $3 \times 68 = 204$
2. $8 \times 23 = 154$
3. $4 \times 99 = 496$
4. $7 \times 52 = 364$
5. $6 \times 39 = 174$
6. $19 \times 19 = 401$
7. $21 \times 49 = 1029$
8. $98 \times 84 = 822$

? Can you use estimation to find which problems Jack missed?

Discussing the Ideas

Give the number you think should go in each ▯.

1. To estimate 3×51, we can find the product $3 \times$ ▯.
2. To estimate 8×42, we can find the product $8 \times$ ▯.
3. To estimate 6×39, we can find the product $6 \times$ ▯.
4. To estimate 9×78, we can find the product $9 \times$ ▯.
5. To estimate 32×29, we can find the product ▯ $\times 30$.
6. To estimate 98×18, we can find the product ▯ $\times 20$.
7. To estimate 45×53, we can find the product ▯ $\times 50$.
8. To estimate 9×207, we can find the product $9 \times$ ▯.
9. To estimate 7×496, we can find the product $7 \times$ ▯.
10. To estimate 32×387, we can find the product $30 \times$ ▯.

1. Give the number you think should go in each ▒.
   - A To estimate 9 × 37, we can find the product 9 × ▒.
   - B To estimate 4 × 96, we can find the product 4 × ▒.
   - C To estimate 46 × 51, we can find the product ▒ × 50.
   - D To estimate 83 × 19, we can find the product 80 × ▒.

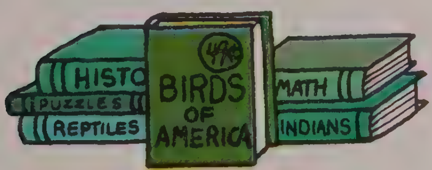
2. **Estimate** these products.

A 6 × 21	E 9 × 68	I 7 × 99	M 98 × 3
B 5 × 32	F 3 × 47	J 37 × 9	N 6 × 56
C 7 × 81	G 6 × 73	K 17 × 6	O 4 × 74
D 8 × 39	H 8 × 18	L 7 × 19	★ P 8 × 65

3. Give an **estimate** for each product.

A 31 × 29	F 64 × 56	K 6 × 198	★ P 51 × 207
B 98 × 21	G 38 × 88	L 3 × 696	★ Q 39 × 289
C 69 × 19	H 65 × 11	M 7 × 516	★ R 44 × 318
D 41 × 51	I 45 × 45	N 8 × 999	★ S 469 × 34
E 82 × 89	J 93 × 18	O 9 × 356	★ T 538 × 651

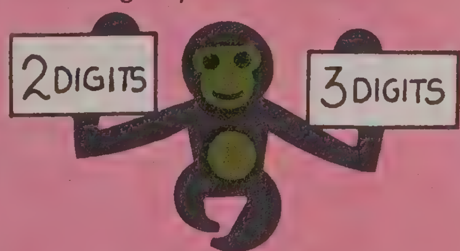
4. **Estimate** the answer.
   - A What did Joe have to pay for 6 books at 49¢ each?



   - B A pail holds about 8 litres. How many litres are in 98 pails?
   - C 24 hours make one day. How many hours are in 62 days?

think

Count my digits; you'll find two.
They're like as like can be.
When you find my sum with 1.
Three digits you will see.



More practice, page A-16, Set 28

Let's estimate quotients.

Investigating the Ideas

Jill made 4 mistakes on her paper.

Jill

1. 56 ÷ 2 = 38	5. 174 ÷ 6 = 19
2. 76 ÷ 4 = 19	6. 294 ÷ 3 = 98
3. 108 ÷ 6 = 18	7. 219 ÷ 3 = 53
4. 84 ÷ 3 = 31	8. 796 ÷ 4 = 199

? Can you use estimation to find which problems Jill missed?

Discussing the Ideas

Thinking about missing factors will help you estimate quotients.

1. Use multiples of ten (10, 20, 30, 40, 50, 60, 70, 80, 90) to estimate these quotients.

? × 4 is about 156
A 156 ÷ 4

? × 6 is about 132
B 132 ÷ 6

? × 3 is about 144
C 144 ÷ 3

? × 6 is about 114
D 114 ÷ 6

? × 3 is about 111
E 111 ÷ 3

? × 7 is about 637
F 637 ÷ 7

2. Estimate these quotients. Use multiples of 10.

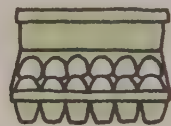
A 128 ÷ 4 C 60 ÷ 5 E 486 ÷ 6 G 129 ÷ 7 I 252 ÷ 5
B 57 ÷ 3 D 98 ÷ 2 F 236 ÷ 4 H 282 ÷ 3 J 222 ÷ 6

Three numbers are given for each problem. Choose the number that is closest to the correct answer.

1. 224 apples
   How many packages of 7 ?
   A 100 B 30 C 80

2. 386 erasers
   How many boxes of 9 ?
   A 400 B 4 C 40

3. 504 crayons
   How many boxes of 8 ?
   A 60 B 100 C 7



4. 276 eggs
   How many cartons of 12 ?
   A 20 B 10 C 100

5. $87 \div 3$ How many threes in 87 ? A 3 B 30 C 20
6. $128 \div 4$ How many fours in 128 ? A 10 B 300 C 30
7. $252 \div 6$ How many sixes in 252 ? A 40 B 50 C 400
8. $686 \div 7$ How many sevens in 686 ? A 10 B 1000 C 100
9. $5760 \div 8$ How many eights in 5760 ? A 70 B 700 C 800
10. $217 \div 31$ How many thirty-ones in 217 ? A 5 B 6 C 7
11. $152 \div 27$ How many twenty-sevens in 152 ? A 10 B 5 C 8
12. $3\overline{)279}$ How many threes in 279 ? A 9 B 900 C 90
13. $5\overline{)525}$ How many fives in 525 ? A 90 B 100 C 200
14. $7\overline{)343}$ How many sevens in 343 ? A 5 B 40 C 50
15. $7\overline{)4760}$ How many sevens in 4760 ? A 600 B 70 C 700
16. $9\overline{)4680}$ How many nines in 4680 ? A 50 B 5000 C 500
17. $53\overline{)212}$ How many fifty-threes in 212 ? A 8 B 5 C 4

★ 18. $25\overline{)224}$ How many twenty-fives in 224 ? A 8 B 10 C 100

More practice, page A-16, Set 29

Solving Short Stories

Estimation

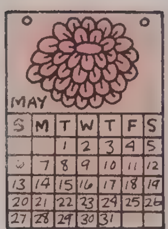
Estimate the answer to each question.

1. 48 pills in each bottle
   7 bottles. How many pills ?

2. 6 tomatoes in each bag.
   32 bags. How many tomatoes ?

3. Travel 642 kilometres in 7 hours.
   About how many kilometres each hour ?

4. About 31 children in each class.
   213 children. How many classes ?



5. Place Ville-Marie.
   188 metres high. 49 stories.
   How high is one story ?

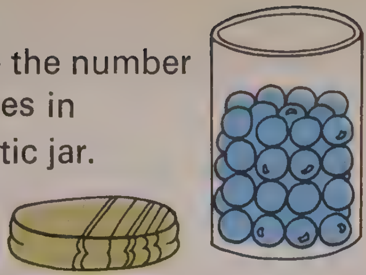
6. About 365 days in a year. 7 days in a week.
   About how many weeks in a year ?

7. 27 cans fit in 1 carton.
   89 cans. About how many cartons ?

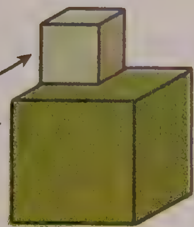
★ 8. 2780 cattle. 72 in each pen.
   About how many pens ?

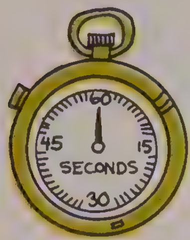
Estimation for Fun

1 Estimate the number of marbles in this plastic jar.



2 If this block of lead weighs 22 kilograms, estimate the weight of this block.





3 Estimate the number of words in exercise 5 by counting the number of words in **one line** and counting the number of lines.

4 Count the number of breaths you take in 1 minute. Estimate the number of breaths you take

A in an hour.

★ B in a 24-hour day.

5 Sally took 4 drinks from the fountain on Monday. Tim took 6 drinks. Bill took 5 drinks. There are 33 children in Sally's class. Estimate how many drinks Sally's class takes from the fountain in A one day. B one week.

6 The tallest horse on record is 21 hands tall. Estimate this horse's height in centimetres.

On a 180-cm man this length is about one hand.

1. Give what you think should go in each gray space.
   - A To estimate 59 + 83, we can find the sum ▒ + 80.
   - B To estimate 396 + 507, we can find the sum 400 + ▒ .
   - C To estimate 7 × 68, we can find the product 7 + ▒ .
   - D To estimate 8 × 497, we can find the product 8 × ▒ .
   - E To estimate 53 × 47, we can find the product ▒ .
   - F To estimate 413 × 89, we can find the product ▒ .
   - G To estimate 426 + 568, we can find the sum ▒ .
   - H To estimate 65 × 9, we can find the product ▒ .
   - I To estimate 403 − 196, we can find the difference ▒ .

2. Estimate the sums, products, and differences.

A 69 + 23	H 407 × 22
B 82 − 49	I 659 + 435
C 8 × 37	J 398 × 21
D 33 × 58	K 49 × 313
E 517 + 89	L 301 × 297
F 95 + 95	M 205 + 298
G 503 − 293	N 39 × 604

think

I'm quite close to one hundred three.
Closer still to ninety-eight.
Yet for both numbers I am used
When you want to estimate.

WHO AM I?

3. Choose the best estimate for each exercise.

A 88 ÷ 4	How many fours in 88?	About 20? 30? 10?
B 434 ÷ 7	How many sevens in 434?	About 100? 70? 60?
C 558 ÷ 6	How many sixes in 558?	About 80? 90? 100?
D 1728 ÷ 32	How many thirty-twos in 1728?	About 100? 50? 6?

4. A cubit is a unit of length first used long ago. It is the distance from a man's elbow to the tip of his fingers. Goliath was reported to be over 6 cubits tall. Estimate Goliath's height in centimetres.

Keeping in Touch with Addition, Subtraction, Multiplication, Division, Place value

1. Find the missing numbers.

A $356 = 300 + 50 + n$ C $639 = n + 30 + 9$ E $6947 = 6047 + n$

B $872 = 800 + n + 2$ D $5436 = 5430 + n$ F $4673 = 4603 + n$

2. Find the sums.

A $\begin{array}{r}39\\68\\+57\\\hline\end{array}$ B $\begin{array}{r}56\\39\\+87\\\hline\end{array}$ C $\begin{array}{r}856\\729\\+347\\\hline\end{array}$ D $\begin{array}{r}638\\463\\+806\\\hline\end{array}$ E $\begin{array}{r}5947\\6879\\+9435\\\hline\end{array}$

3. Find the differences.

A $\begin{array}{r}234\\-39\\\hline\end{array}$ B $\begin{array}{r}195\\-39\\\hline\end{array}$ C $\begin{array}{r}156\\-39\\\hline\end{array}$ D $\begin{array}{r}117\\-39\\\hline\end{array}$ E $\begin{array}{r}78\\-39\\\hline\end{array}$ F $\begin{array}{r}39\\-39\\\hline\end{array}$

4. Use exercise 3 to give the number of thirty-nines in 234.

5. List the problems that have no whole-number answers. Then find the differences for the other exercises.

A $\begin{array}{r}147\\-108\\\hline\end{array}$ B $\begin{array}{r}281\\-315\\\hline\end{array}$ C $\begin{array}{r}370\\-106\\\hline\end{array}$ D $\begin{array}{r}304\\-137\\\hline\end{array}$ E $\begin{array}{r}874\\-396\\\hline\end{array}$ F $\begin{array}{r}387\\-431\\\hline\end{array}$

G $\begin{array}{r}500\\-287\\\hline\end{array}$ H $\begin{array}{r}1008\\-369\\\hline\end{array}$ I $\begin{array}{r}1870\\-1798\\\hline\end{array}$ J $\begin{array}{r}9007\\-8438\\\hline\end{array}$ K $\begin{array}{r}4976\\-1098\\\hline\end{array}$

6. Find the products and quotients.

A 9×40 D 200×8 G 20×50 J 30×400

B 30×7 E $360 \div 4$ H 60×30 K $3600 \div 4$

C 70×6 F $720 \div 8$ I $800 \div 40$ L 500×300

You are invited to explore

ACTIVITY CARD 7
Page 350

8

Multiplying

Let's use the multiplication-addition principle.

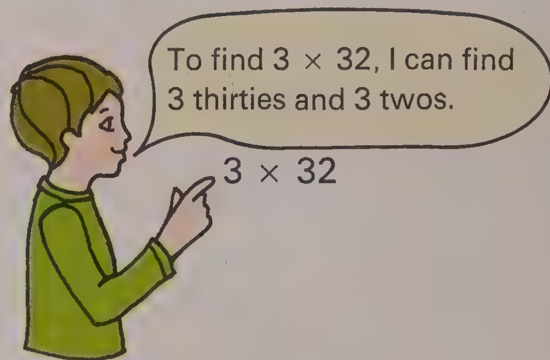
Investigating the Ideas

You have a dollar to spend. The cost of each item is shown in coins.

?

Can you buy 3 hamburgers? 3 hot dogs? 3 tacos?

Discussing the Ideas



1. A Explain how Steve is thinking about 3 × 32.
   B How would Steve think about 3 × 34?

2. Give the missing words.
   A To find 4 × 26, we can find 4 twenties and 4 __?__.
   B To find 2 × 37, we can find 2 __?__ and 2 sevens.
   C To find 3 × 42, we can find 3 forties and 3 __?__.
   D To find 5 × 24, we find 5 __?__ and 5 __?__.
   E To find 3 × 25, we can find 3 __?__ and 3 __?__.
   F To find 6 × 14, we can find 6 __?__ and 6 __?__.

3. Can you find each product in exercise 2?

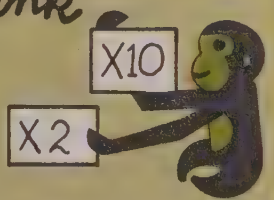
1. Solve the equations.

A $4 \times 25 = (4 \times 20) + (4 \times n)$
B $6 \times 32 = (6 \times 30) + (6 \times n)$
C $5 \times 18 = (5 \times 10) + (5 \times n)$
D $3 \times 56 = (3 \times 50) + (3 \times n)$
E $8 \times 21 = (8 \times 20) + (8 \times n)$
F $7 \times 92 = (7 \times n) + (7 \times 2)$
G $3 \times 76 = (3 \times n) + (3 \times 6)$
H $9 \times 58 = (9 \times n) + (9 \times 8)$
I $4 \times 35 = (4 \times n) + (4 \times 5)$
J $8 \times 47 = (8 \times n) + (8 \times 7)$

2. Solve the equations.

A $3 \times 16 = (3 \times 10) + (3 \times 6) = n$
B $5 \times 23 = (5 \times 20) + (5 \times 3) = n$
C $4 \times 38 = (4 \times 30) + (4 \times 8) = n$
D $9 \times 42 = (9 \times 40) + (9 \times 2) = n$
E $7 \times 57 = (7 \times 50) + (7 \times 7) = n$
F $8 \times 64 = (8 \times 60) + (8 \times 4) = n$
G $6 \times 79 = (6 \times 70) + (6 \times 9) = n$
H $5 \times 86 = (5 \times 80) + (5 \times 6) = n$
I $9 \times 95 = (9 \times 90) + (9 \times 5) = n$

think



To multiply by me,
Here's what you can do:
First multiply by 10;
Then multiply by 2.

WHO AM I?

3. Give the missing numbers.

A Since $4 \times 80 = 320$, we know that $4 \times 81 = n$.
B Since $7 \times 50 = 350$, we know that $7 \times 51 = n$.
C Since $6 \times 80 = 480$, we know that $6 \times 82 = n$.
D Since $4 \times 90 = 360$, we know that $4 \times 94 = n$.
E Since $8 \times 70 = 560$, we know that $8 \times 73 = n$.

★ **4.** Solve the equations.

A $20 \times 43 = (20 \times 40) + (20 \times 3) = n$
B $60 \times 74 = (60 \times 70) + (60 \times 4) = n$
C $30 \times 86 = (30 \times 80) + (30 \times 6) = n$
D $50 \times 29 = (50 \times 20) + (50 \times 9) = n$
E $90 \times 98 = (90 \times 90) + (90 \times 8) = n$
F $23 \times 34 = (23 \times 30) + (23 \times 4) = n$
G $34 \times 45 = (34 \times 40) + (34 \times 5) = n$

More practice, page A-17, Set 30

Investigating the Ideas

Here is a function table for finding this product. Find the product.

$$\begin{array}{r} 45 \\ \times\ 3 \\ \hline \end{array}$$

Function Rule

Multiply by 3

Input	Output
5	15
40	120
45	▒▒

? Can you make a function table for this product?

$$\begin{array}{r} 37 \\ \times\ 4 \\ \hline \end{array}$$

Discussing the Ideas

1. Compare this method with the function table above. Find the final product.

$$\begin{array}{r} 45 \\ \times\ 3 \\ \hline 15 \\ 120 \\ \hline ▒▒ \end{array}$$

2. Find the product 37 × 4 using the method in exercise 1.

3. Explain each step in the shortcut.

$$\begin{array}{r} 26 \\ \times 3 \\ \hline 18 \\ 60 \\ \hline 78 \end{array} \Rightarrow \begin{array}{r} \overset{1}{2}6 \\ \times 3 \\ \hline 8 \end{array} \Rightarrow \begin{array}{r} \overset{1}{2}6 \\ \times 3 \\ \hline 78 \end{array}$$

4. Explain each example.

A $\begin{array}{r} \overset{4}{3}8 \\ \times 6 \\ \hline 228 \end{array}$ B $\begin{array}{r} \overset{2}{5}4 \\ \times 7 \\ \hline 378 \end{array}$ C $\begin{array}{r} \overset{2}{6}5 \\ \times 4 \\ \hline 260 \end{array}$ D $\begin{array}{r} \overset{1}{8}2 \\ \times 9 \\ \hline 738 \end{array}$

In exercises 1 to 4, copy each equation and give the missing number.

1. A $3 \times 12 = (3 \times 10) + (3 \times n)$
B $3 \times 12 = 30 + n$
C $3 \times 12 = n$

2. A $4 \times 21 = (4 \times n) + (4 \times 1)$
B $4 \times 21 = n + 4$
C $4 \times 21 = n$

3. A $3 \times 25 = (3 \times n) + (3 \times 5)$
B $3 \times 25 = n + 15$
C $3 \times 25 = n$

4. A $6 \times 14 = (6 \times 10) + (6 \times n)$
B $6 \times 14 = 60 + n$
C $6 \times 14 = n$

5. Copy each exercise and give the missing number.

A $\begin{array}{r} 46 \\ \times 3 \\ \hline 18 \\ 120 \\ \hline \square \end{array}$
B $\begin{array}{r} 64 \\ \times 7 \\ \hline \square \\ 420 \\ \hline 448 \end{array}$
C $\begin{array}{r} 18 \\ \times 4 \\ \hline 32 \\ 40 \\ \hline \square \end{array}$
D $\begin{array}{r} 43 \\ \times 5 \\ \hline 15 \\ \square \\ \hline 215 \end{array}$
E $\begin{array}{r} 84 \\ \times 2 \\ \hline 8 \\ 160 \\ \hline \square \end{array}$
F $\begin{array}{r} 65 \\ \times 3 \\ \hline \square \\ 180 \\ \hline 195 \end{array}$

6. Find the products.

A $\begin{array}{r} 48 \\ \times 2 \\ \hline \end{array}$
B $\begin{array}{r} 32 \\ \times 6 \\ \hline \end{array}$
C $\begin{array}{r} 16 \\ \times 4 \\ \hline \end{array}$
D $\begin{array}{r} 14 \\ \times 6 \\ \hline \end{array}$

E $\begin{array}{r} 35 \\ \times 9 \\ \hline \end{array}$
F $\begin{array}{r} 62 \\ \times 4 \\ \hline \end{array}$
G $\begin{array}{r} 53 \\ \times 8 \\ \hline \end{array}$
H $\begin{array}{r} 71 \\ \times 3 \\ \hline \end{array}$

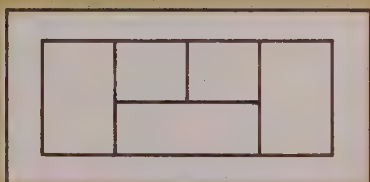
I $\begin{array}{r} 55 \\ \times 8 \\ \hline \end{array}$
J $\begin{array}{r} 46 \\ \times 7 \\ \hline \end{array}$
K $\begin{array}{r} 39 \\ \times 2 \\ \hline \end{array}$
L $\begin{array}{r} 18 \\ \times 5 \\ \hline \end{array}$

7. Solve the equations.

A $4 \times 6 \times 3 = n$
B $5 \times 7 \times 4 = n$
C $3 \times 6 \times 2 = n$
D $9 \times 4 \times 5 = n$
E $6 \times 7 \times 6 = n$
F $8 \times 7 \times 4 = n$
G $7 \times 2 \times 7 = n$
H $9 \times 8 \times 7 = n$

think

Draw a figure like the one below, only larger. Now try to color this "map" with just 4 colors. All bordering regions should be different colors.



More practice, page A-17, Set 31

Discussing the Ideas

1. Can you explain this method for finding this product?

$$\begin{array}{r} 256 \\ \times\ 3 \\ \hline \end{array} \longrightarrow \begin{array}{r} 200 \\ 50 \\ 6 \\ \times\ 3 \\ \hline 18 \\ 150 \\ 600 \\ \hline \text{\_\_\_\_} \end{array}$$

What is the product? → ____

2. Explain each step and give the missing numbers.

Step 1	Step 2	Step 3	Step 4
$\begin{array}{r} 347 \\ \times\ 5 \\ \hline \text{\_\_\_\_} \end{array}$	$\begin{array}{r} 347 \\ \times\ 5 \\ \hline 35 \\ \text{\_\_\_\_} \end{array}$	$\begin{array}{r} 347 \\ \times\ 5 \\ \hline 35 \\ 200 \\ \text{\_\_\_\_} \end{array}$	$\begin{array}{r} 347 \\ \times\ 5 \\ \hline 35 \\ 200 \\ 1500 \\ \hline \text{\_\_\_\_} \end{array}$
5×7	5×40	5×300	$35 + 200 + 1500$

3. Explain the shortcut shown below.

$$\begin{array}{r} 436 \\ \times 4 \\ \hline 24 \\ 120 \\ 1600 \\ \hline 1744 \end{array} \Rightarrow \begin{array}{r} {}^{1}4{}^{2}36 \\ \times 4 \\ \hline 1744 \end{array}$$

1. Copy each exercise and give the missing number.

A	B	C	D	E
254	621	523	562	142
×3	×7	×4	×5	×6
12	■	12	10	■
150	140	■	300	240
600	4200	2000	■	600
■	4347	2092	2810	852

2. Find the products.

A	B	C	D	E	F
213 ×3	416 ×2	532 ×4	618 ×3	729 ×5	843 ×6

G	H	I	J	K	L
348 ×4	217 ×5	618 ×2	521 ×4	603 ×9	735 ×2

M	N	O	P	Q	R
642 ×3	815 ×6	921 ×3	926 ×2	138 ×6	507 ×8

★

S	T	U	V	W	X
7651 ×7	3716 ×4	5481 ×7	6567 ×6	8035 ×5	7604 ×4

3. Find the products.

A $24 \times 6 \times 3$ B $5 \times 47 \times 3$ C $4 \times 56 \times 2$ D $7 \times 25 \times 4$

think

Study the pattern.
Then solve the equations.

$(1 \times 9) + 2 = 11$

$(12 \times 9) + 3 = 111$

$(123 \times 9) + 4 = 1111$

$(1234 \times 9) + 5 = 11\,111$

$(12\,345 \times 9) + 6 = n$

$(123\,456 \times 9) + 7 = n$

Now check your answers.

More practice, page A-18, Set 32

Short Picture Problems

1.	IF	1 EGGS	12	THEN	5 EGGS	?
2.	IF	1	35	THEN	6	?
3.	IF	1 MILK	4	THEN	24 MILK	?

Short Story Problems

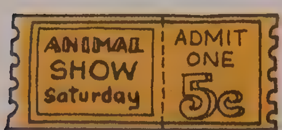
1 Cost 6 cents each.
Bought 42.
Spent how much?

2 Cost 42 cents each.
Bought 6.
Spent how much?

3 2 dozen in a box.
Had 8 boxes full.
How many in all?

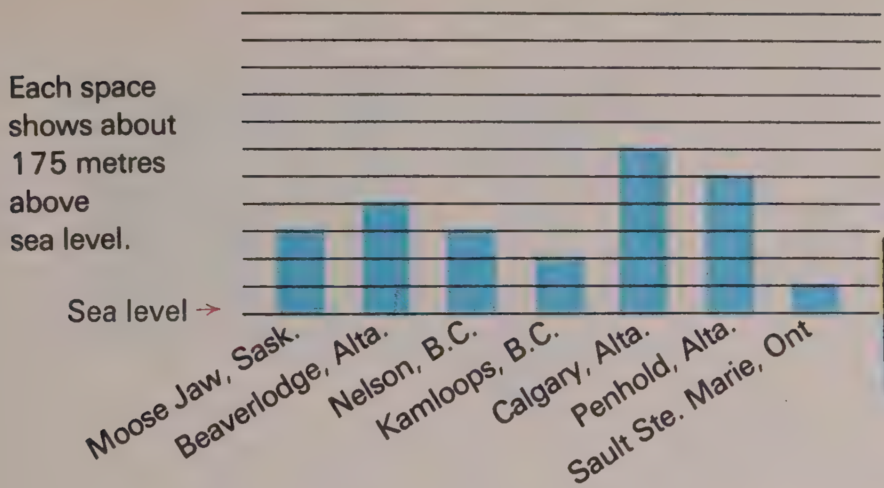
4 12 apples per kilogram.
7 kilograms.
How many apples?

5 5 school days a week.
36 weeks of school.
How many days?



6 12 girls, 15 boys.
Admission: 5 cents each.
How much for all?

City Altitudes



1. Study the bar graph. Then make a table like the one on the right. Give the missing altitudes.

City	Altitude
	(About)
Moose Jaw	525
Beaverlodge	
Nelson	
Sault Ste. Marie	175
Calgary	
Penhold	
Kamloops	

2. About how much higher is Penhold then Nelson ?

3. The highest large city in the United States is Santa Fe, New Mexico. It is 2085 metres above sea level. How much higher is Santa Fe than Kamloops ?

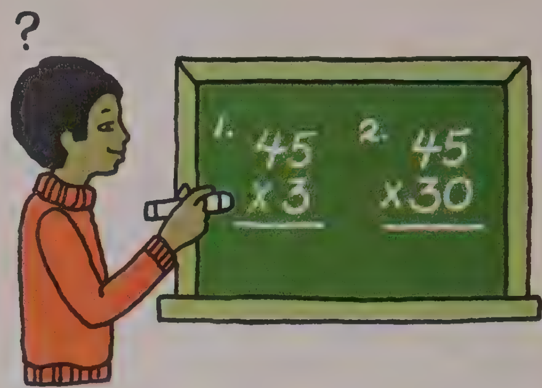
4. Armstrong, B.C., is about 350 metres above sea level. Jasper, Alta., is at an altitude about 3 times as high as Armstrong. What is the altitude of Jasper ?

5. The surface of the Dead Sea in Palestine is 388 metres below sea level. How much higher is Calgary then the surface of the Dead Sea ?

★ 6. The Dead Sea at its deepest point is 393 metres deep. What is the difference in altitude between the bottom of the Dead Sea and Kamloops, B.C. ?

Investigating the Ideas

Jim thought he could find the first product. He wasn't sure of the second.



? Can you find the first product and show on your paper how to use it to find the second product ?

Discussing the Ideas

1. Find each of these products.

A 10×45	C 20×45	E 30×45
B $10 \times 2 \times 45$	D $10 \times 3 \times 45$	F 40×45

2. A Explain step 1 in the diagram.
   B What principle is used for step 2 ?
   C Explain steps 3 and 4.
   D Solve: $43 \times 20 = n$
   E Explain this statement:
   Since $43 \times 2 = 86$, we know that $43 \times 20 = 860$.

20×43
$\boxed{1}$ $(10 \times 2) \times 43$
$\boxed{2}$ $10 \times (2 \times 43)$
$\boxed{3}$ 10×86
$\boxed{4}$ 860

3. Can you give an easy rule for multiplying by the 2-digit multiples of ten: 10, 20, 30 . . . ?

1. Find the products.

A Since $34 \times 2 = 68$, we know that $34 \times 20 = n$.

B Since $17 \times 3 = 51$, we know that $17 \times 30 = n$.

C Since $36 \times 7 = 252$, we know that $36 \times 70 = n$.

2. Find the products.

A $\begin{array}{r} 36 \\ \times 4 \\ \hline \end{array}$ $\begin{array}{r} 36 \\ \times 40 \\ \hline \end{array}$ B $\begin{array}{r} 53 \\ \times 2 \\ \hline \end{array}$ $\begin{array}{r} 53 \\ \times 20 \\ \hline \end{array}$ C $\begin{array}{r} 78 \\ \times 3 \\ \hline \end{array}$ $\begin{array}{r} 78 \\ \times 30 \\ \hline \end{array}$ D $\begin{array}{r} 93 \\ \times 5 \\ \hline \end{array}$ $\begin{array}{r} 93 \\ \times 50 \\ \hline \end{array}$

E $\begin{array}{r} 86 \\ \times 4 \\ \hline \end{array}$ $\begin{array}{r} 86 \\ \times 40 \\ \hline \end{array}$ F $\begin{array}{r} 75 \\ \times 6 \\ \hline \end{array}$ $\begin{array}{r} 75 \\ \times 60 \\ \hline \end{array}$ G $\begin{array}{r} 47 \\ \times 8 \\ \hline \end{array}$ $\begin{array}{r} 47 \\ \times 80 \\ \hline \end{array}$ H $\begin{array}{r} 56 \\ \times 4 \\ \hline \end{array}$ $\begin{array}{r} 56 \\ \times 40 \\ \hline \end{array}$

3. Study the example. Then find the products.

Step 1	Step 2	Step 3
$\begin{array}{r} 47 \\ \times 50 \\ \hline 0 \end{array}$	$\begin{array}{r} {}^{3} \\ 47 \\ \times 50 \\ \hline 50 \end{array}$	$\begin{array}{r} {}^{3} \\ 47 \\ \times 50 \\ \hline 2350 \end{array}$

A $\begin{array}{r} 63 \\ \times 20 \\ \hline \end{array}$ B $\begin{array}{r} 75 \\ \times 30 \\ \hline \end{array}$ C $\begin{array}{r} 81 \\ \times 40 \\ \hline \end{array}$

D $\begin{array}{r} 67 \\ \times 30 \\ \hline \end{array}$ E $\begin{array}{r} 45 \\ \times 60 \\ \hline \end{array}$ F $\begin{array}{r} 54 \\ \times 80 \\ \hline \end{array}$

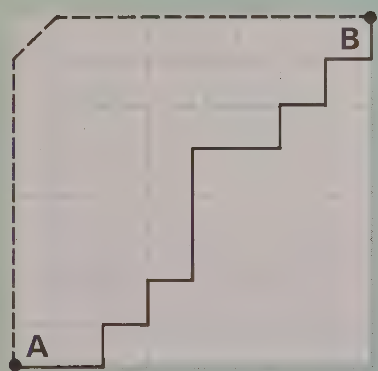
G $\begin{array}{r} 76 \\ \times 20 \\ \hline \end{array}$ H $\begin{array}{r} 49 \\ \times 60 \\ \hline \end{array}$ I $\begin{array}{r} 38 \\ \times 50 \\ \hline \end{array}$

J $\begin{array}{r} 67 \\ \times 90 \\ \hline \end{array}$ K $\begin{array}{r} 83 \\ \times 40 \\ \hline \end{array}$ L $\begin{array}{r} 92 \\ \times 50 \\ \hline \end{array}$

think

In the figure below, which path between **A** and **B** is shorter, the solid path or the dashed path?

Explain your answer.



More practice, page A-18, Set 33

Investigating the Ideas

? Can you find each of these products?

You already know how to find these products.

$$\begin{array}{r} 43 \\ \times 5 \\ \hline \end{array} \qquad \begin{array}{r} 43 \\ \times 30 \\ \hline \end{array}$$

They will help you find this product.

$$\begin{array}{r} 43 \\ \times 35 \\ \hline \end{array}$$

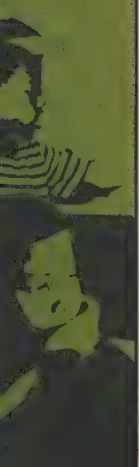
Discussing the Ideas

1. Explain each step in the example below and give the missing numbers.

Step 1	Step 2	Step 3
$\begin{array}{r} 4\ 6 \\ \times\ 2\ 3 \\ \hline \_\_\_ \end{array}$	$\begin{array}{r} 4\ 6 \\ \times\ 2\ 3 \\ \hline 1\ 3\ 8 \\ \_\_\_ \end{array}$	$\begin{array}{r} 4\ 6 \\ \times\ 2\ 3 \\ \hline 1\ 3\ 8 \\ 9\ 2\ 0 \\ \hline \_\_\_ \end{array}$
3×46	20×46	$138 + 920$

2. Find this product and check your answer with your teacher.

$$\begin{array}{r} 4\ 2 \\ \times\ 3\ 6 \\ \hline \end{array}$$



1. Find the products.

A $\begin{array}{r} 46 \\ \times 23 \\ \hline \end{array}$	B $\begin{array}{r} 54 \\ \times 12 \\ \hline \end{array}$	C $\begin{array}{r} 71 \\ \times 24 \\ \hline \end{array}$	D $\begin{array}{r} 32 \\ \times 14 \\ \hline \end{array}$	E $\begin{array}{r} 65 \\ \times 24 \\ \hline \end{array}$	F $\begin{array}{r} 56 \\ \times 57 \\ \hline \end{array}$	G $\begin{array}{r} 28 \\ \times 75 \\ \hline \end{array}$
H $\begin{array}{r} 61 \\ \times 78 \\ \hline \end{array}$	I $\begin{array}{r} 47 \\ \times 36 \\ \hline \end{array}$	J $\begin{array}{r} 55 \\ \times 26 \\ \hline \end{array}$	K $\begin{array}{r} 34 \\ \times 96 \\ \hline \end{array}$	L $\begin{array}{r} 48 \\ \times 48 \\ \hline \end{array}$	M $\begin{array}{r} 39 \\ \times 93 \\ \hline \end{array}$	N $\begin{array}{r} 57 \\ \times 61 \\ \hline \end{array}$
O $\begin{array}{r} 99 \\ \times 22 \\ \hline \end{array}$	P $\begin{array}{r} 68 \\ \times 45 \\ \hline \end{array}$	Q $\begin{array}{r} 15 \\ \times 48 \\ \hline \end{array}$	R $\begin{array}{r} 49 \\ \times 60 \\ \hline \end{array}$	S $\begin{array}{r} 69 \\ \times 96 \\ \hline \end{array}$	T $\begin{array}{r} 25 \\ \times 68 \\ \hline \end{array}$	U $\begin{array}{r} 76 \\ \times 67 \\ \hline \end{array}$

2. Find the products.

A $\begin{array}{r} 357 \\ \times 3 \\ \hline \end{array} \rightarrow \begin{array}{r} 357 \\ \times 30 \\ \hline \end{array}$ B $\begin{array}{r} 672 \\ \times 4 \\ \hline \end{array} \rightarrow \begin{array}{r} 672 \\ \times 40 \\ \hline \end{array}$ C $\begin{array}{r} 719 \\ \times 5 \\ \hline \end{array} \rightarrow \begin{array}{r} 719 \\ \times 50 \\ \hline \end{array}$

3. Find the products.

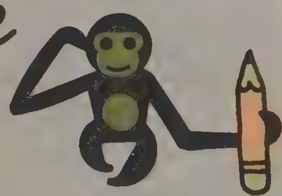
A $\begin{array}{r} 654 \\ \times 2 \\ \hline \end{array} \quad \begin{array}{r} 654 \\ \times 30 \\ \hline \end{array} \rightarrow \begin{array}{r} 654 \\ \times 32 \\ \hline \end{array}$

B $\begin{array}{r} 467 \\ \times 5 \\ \hline \end{array} \quad \begin{array}{r} 467 \\ \times 20 \\ \hline \end{array} \rightarrow \begin{array}{r} 467 \\ \times 25 \\ \hline \end{array}$

C $\begin{array}{r} 721 \\ \times 3 \\ \hline \end{array} \quad \begin{array}{r} 721 \\ \times 40 \\ \hline \end{array} \rightarrow \begin{array}{r} 721 \\ \times 43 \\ \hline \end{array}$

D $\begin{array}{r} 264 \\ \times 4 \\ \hline \end{array} \quad \begin{array}{r} 264 \\ \times 40 \\ \hline \end{array} \rightarrow \begin{array}{r} 264 \\ \times 44 \\ \hline \end{array}$

think



If you study this product carefully,

$$\begin{array}{r} 12\,345\,679 \\ \times 9 \\ \hline 111\,111\,111 \end{array}$$

you should be able to solve these equations quickly.

1. $12\,345\,679 \times 18 = n$
2. $12\,345\,679 \times 27 = n$
3. $12\,345\,679 \times 63 = n$

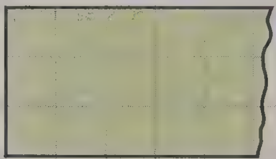
4. Find the products.

A $\begin{array}{r} 391 \\ \times 12 \\ \hline \end{array}$ B $\begin{array}{r} 283 \\ \times 41 \\ \hline \end{array}$ C $\begin{array}{r} 465 \\ \times 26 \\ \hline \end{array}$ D $\begin{array}{r} 802 \\ \times 81 \\ \hline \end{array}$ E $\begin{array}{r} 643 \\ \times 56 \\ \hline \end{array}$ F $\begin{array}{r} 839 \\ \times 83 \\ \hline \end{array}$

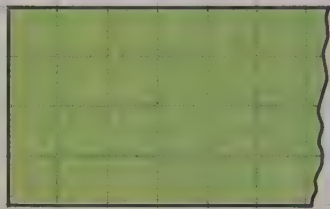
More practice, page A-19, Set 34

1. Find the area for each exercise.

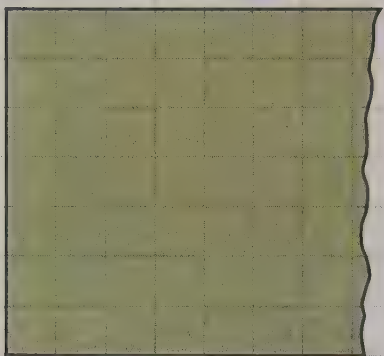
A 16 in each row →



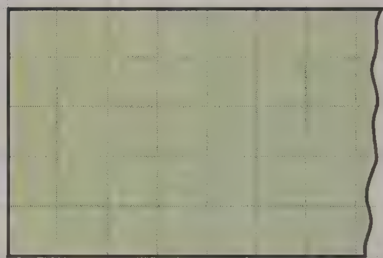
B 36 in each row →



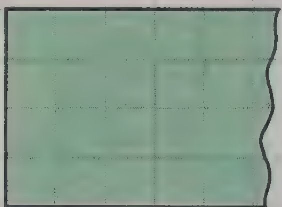
C 28 in each row →



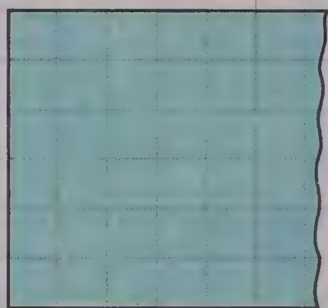
D 57 in each row →



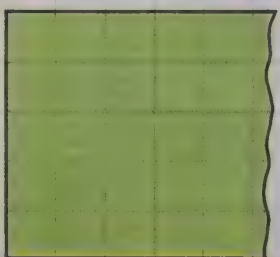
E 167 in each row →



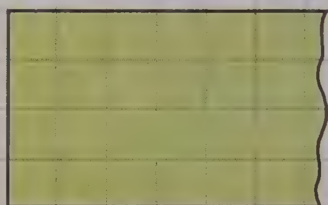
F 349 in each row →



G 2643 in each row →

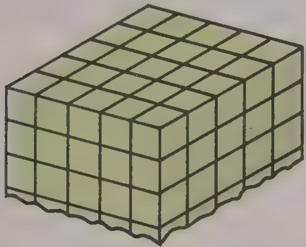


H 5368 in each row →



2. Give the volume for each exercise.

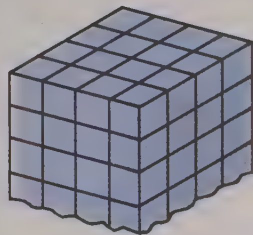
A



25 in each layer

17 layers

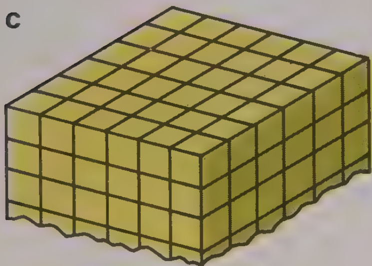
B



16 in each layer

47 layers

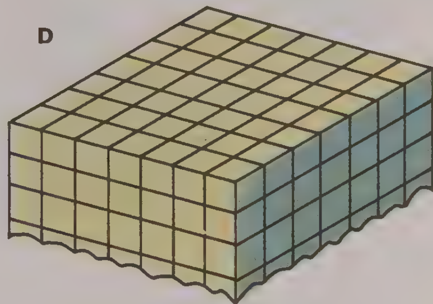
C



36 in each layer

58 layers

D



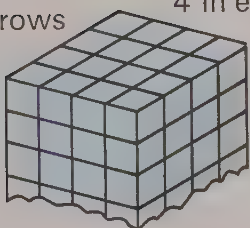
49 in each layer

34 layers

E

4 rows

4 in each row

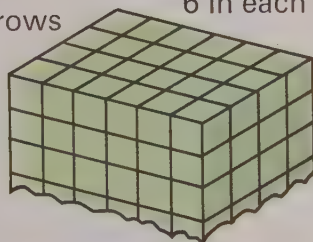


54 layers

F

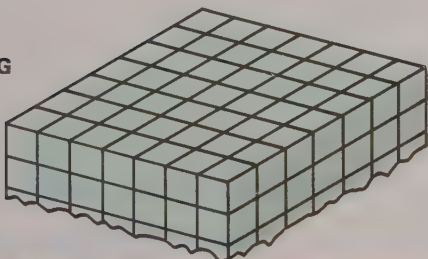
4 rows

6 in each row



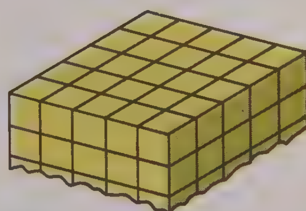
63 layers

G

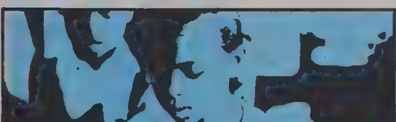


68 layers

H



92 layers

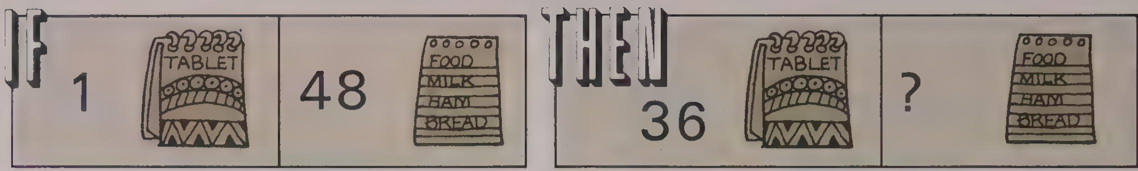


You are invited to explore

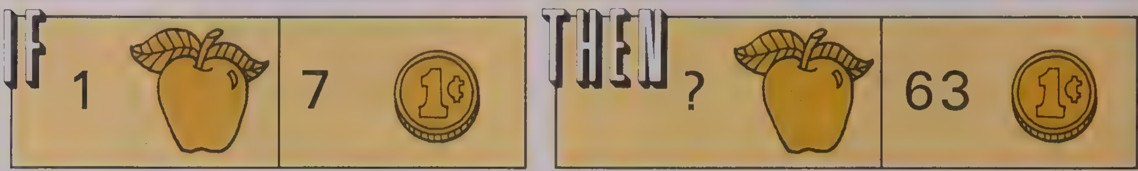
ACTIVITY CARD 8
Page 351

Short Picture Problems

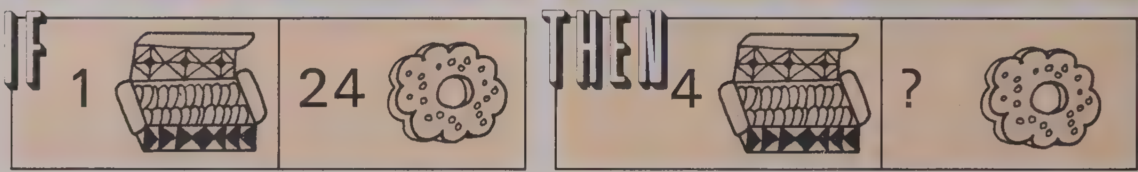
1.



2.



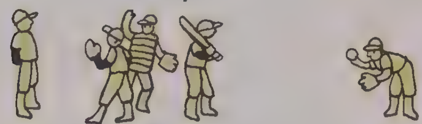
3.



Short Stories

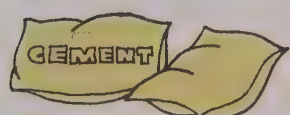
1 Auditorium. 32 rows of seats. 25 seats in each row. How many seats?

2 Driving. 72 kilometres each hour. 25 hours. How far?



3 74 children. 38 girls. How many boys?

4 17 teams. 12 on each team. How many in all?

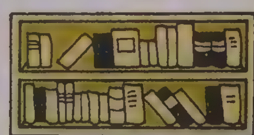


5 34 sacks of cement. Weigh 40 kilograms each. What is the total weight?

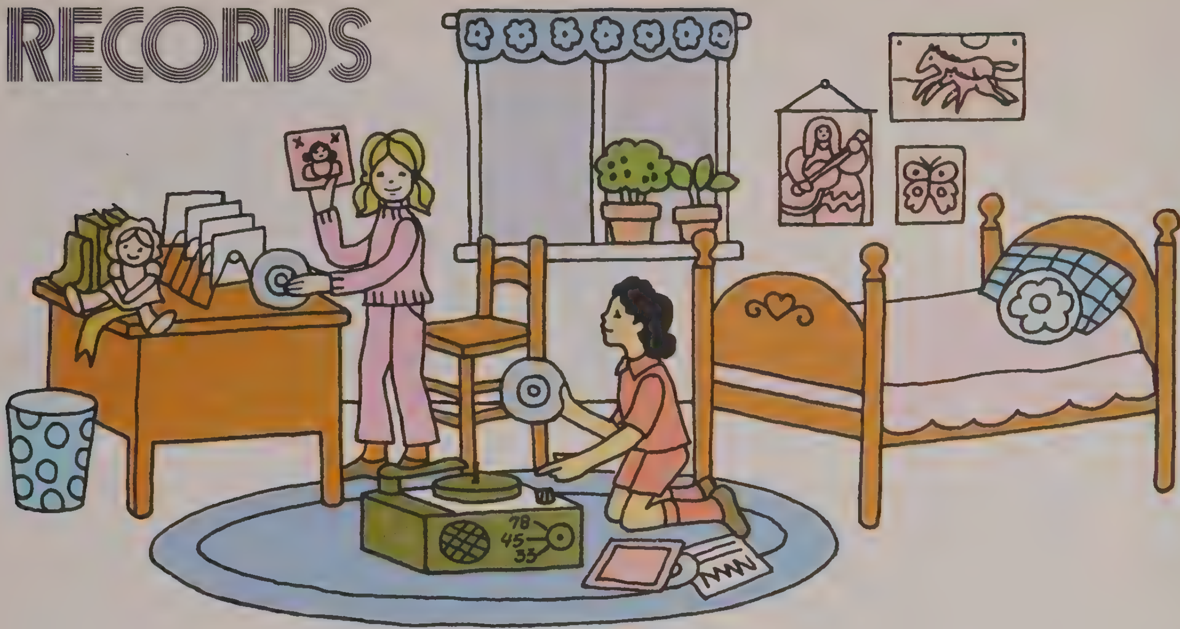
6 468 girls. 397 boys. 39 teachers. How many people in all?

7 15 shelves. 38 books on each shelf. How many books?

8 Had 47 cents. Earned 15 cents. Spent 37 cents. Can buy how many 5-cent candy bars now?



RECORDS



1. For some records, the turntable must be set to turn the record 45 times each minute (45 revolutions per minute). If it takes 3 minutes to play a "45 record," how many times does it turn around?

2. Some records play best when they go around about 33 times each minute. These are called long-playing (L.P.) records. If an L.P. takes 27 minutes to play, how many times does it go around?

3. Jan played 12 records one Saturday. Each one lasted 18 minutes. How long did Jan use her record player that day?

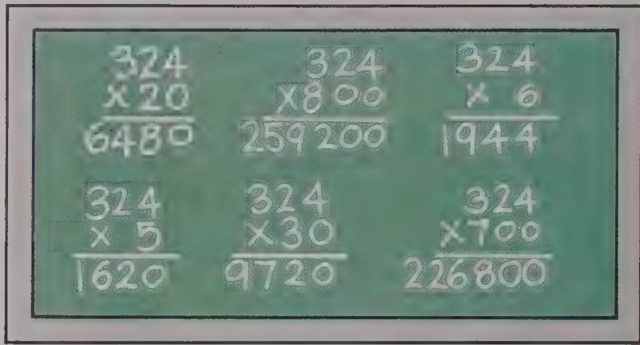
4. Some older records turn 78 times each minute. How many turns would a "78 record" make in 5 minutes?

★ 5. Betty played 6 records, and each one lasted 3 minutes. If each was a "45 record," how many times did the turntable go around while the records were playing?

More practice, page A-19, Set 35

Investigating the Ideas

This chalkboard shows some products when 324 is one of the factors.



? Can you find this product without doing any multiplying?

$$\begin{array}{r} 3\;2\;4 \\ \times\;7\;3\;6 \\ \hline \end{array}$$

Discussing the Ideas

1. Explain how you used the products shown on the chalkboard to find 324 × 736.

2. Find as many of these products as you can. Then check your answers with your teacher.

   A $\begin{array}{r} 245 \\ \times 3 \\ \hline \end{array}$ $\begin{array}{r} 245 \\ \times 30 \\ \hline \end{array}$ $\begin{array}{r} 245 \\ \times 300 \\ \hline \end{array}$ $\begin{array}{r} 245 \\ \times 333 \\ \hline \end{array}$ **B** $\begin{array}{r} 162 \\ \times 4 \\ \hline \end{array}$ $\begin{array}{r} 162 \\ \times 40 \\ \hline \end{array}$ $\begin{array}{r} 162 \\ \times 400 \\ \hline \end{array}$ $\begin{array}{r} 162 \\ \times 444 \\ \hline \end{array}$

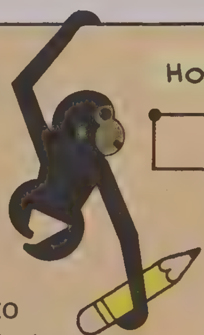
3. Explain the steps below. Give the missing numbers.

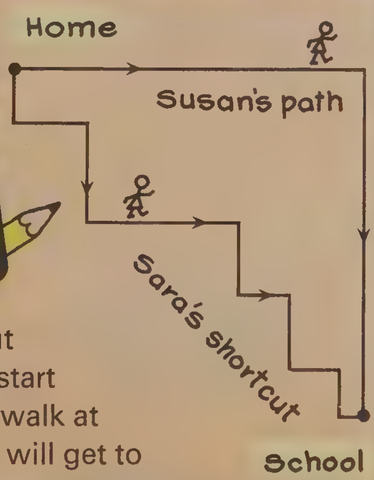
Step 1	Step 2	Step 3	Step 4
$\begin{array}{r} 514 \\ \times 263 \\ \hline \_\_\_\_ \end{array}$	$\begin{array}{r} 514 \\ \times 263 \\ \hline 1\,542 \\ \_\_\_\_ \end{array}$	$\begin{array}{r} 514 \\ \times 263 \\ \hline 1\,542 \\ 30\,840 \\ \_\_\_\_ \end{array}$	$\begin{array}{r} 514 \\ \times 263 \\ \hline 1\,542 \\ 30\,840 \\ 102\,800 \\ \hline \_\_\_\_ \end{array}$

Find the products.

1. 50×36
2. 48×90
3. 327×5
4. 619×7
5. 823×9
6. 695×8
7. 824×9
8. 907×50
9. 762×48
10. 929×88
11. 654×28
12. 802×43
13. 765×563
14. 807×444
15. 700×64
16. 930×607
17. 920×307
18. 526×710
19. 621×243
20. 517×444
21. 823×615
22. 264×222
23. 575×314
24. 605×333
25. 316×634
26. 824×111
27. 967×121
28. 542×596
29. 568×666
30. 397×260
31. 908×307
32. 967×384
33. 659×555
34. 803×327
35. $9 \times 7 \times 4 \times 6$
36. $6 \times 7 \times 8 \times 5$
37. $4 \times 9 \times 8 \times 6$
38. $8 \times 8 \times 8 \times 8$
39. $8 \times 7 \times 326$
40. $921 \times 3 \times 47$
41. $4 \times 389 \times 0$
42. $2 \times 12 \times 13$

think

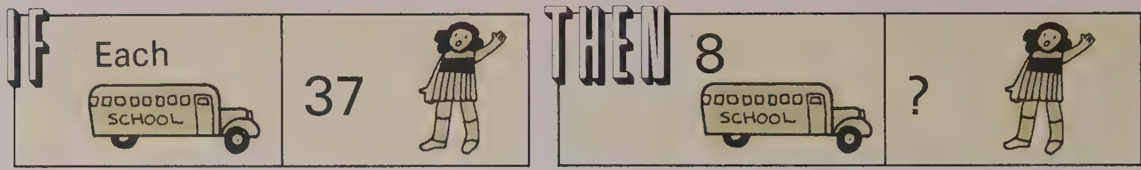




Susan and her sister Sara walk to school each day. Sara knows a shortcut to school. If the girls start at the same time and walk at the same speed, who will get to school first? Explain your answer.

More practice, page A-20, Set 36

Short Picture Problems

1. 

2. 

3. 

Short Stories

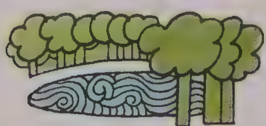
1 48 sacks.
75 kilograms each.
How many kilograms ?

2 12 eggs in a carton.
94 cartons.
How many eggs ?

3 72 players.
8 on a team.
How many teams ?

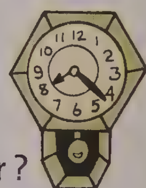
4 72 teams.
8 on a team.
How many players ?

5 72 on each team.
8 teams.
How many players ?



6 640 sites in 1 campground.
Park: 54 campgrounds.
How many campsites ?

☆ **7** 60 minutes in an hour.
24 hours in a day.
365 days in a year.
How many minutes in a year ?



☆ **8** 26 rows of seats.
18 seats in a row.
295 people.
How many extra seats ?

More practice, page A-20, Set 37

Niagara Falls

Niagara Falls is a group of waterfalls located partly in Canada and partly in the United States. The area is world famous for its beauty. Electricity is produced by great generating stations located there.

The Falls is 50 metres high, and the river is nearly 1600 metres wide at the Falls. The Falls is about 25 000 years old. It moves back approximately 120 centimetres every year because of falling rocks.

1. How many centimetres is it from the base of the Falls to the top ?

2. In January, 1931, nearly 70 000 metric tons of rock fell to the bottom of the American side of the Falls. Another 185 000 metric tons fell in July, 1954. What was the total number of tons that fell ?

3. The Falls were first described by Father Hennepin, a Franciscan missionary who saw them in 1678. How far have they moved back since then ?

4. How many metres has the Falls moved back since its beginning about 25 000 years ago ?

Reviewing the Ideas

Find the products.

1. 54×4	2. 26×3	3. 75×5	4. 82×2	5. 94×7
6. 67×8	7. 361×5	8. 278×6	9. 763×4	10. 403×9
11. 921×3	12. 3462×5	13. 5278×3	14. 6439×7	15. 8432×6
16. 32×44	17. 67×28	18. 46×59	19. 38×51	20. 60×75
21. 98×67	22. 347×20	23. 618×36	24. 514×48	25. 396×52
26. 821×95	27. 367×72	28. 280×43	29. 546×61	30. 904×55
31. 831×723	32. 766×803			
33. 685×720	34. 864×271			

35. $7 \times 9 \times 8$

36. $9 \times 6 \times 7 \times 7$

37. $27 \times 2 \times 314$

38. $218 \times 2 \times 13$

39. $34 \times 26 \times 5$

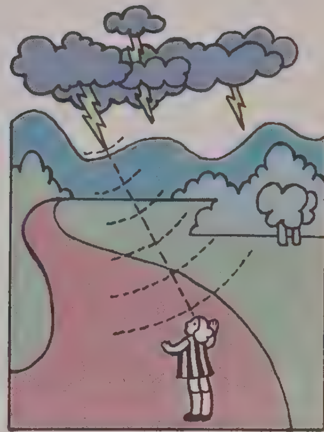
40. $26 \times 538 \times 1$

think

Study the pattern. Then copy the equations. Give the missing numbers.

$1 \times 8 = 10 - 2$
$2 \times 8 = 20 - 4$
$3 \times 8 = 30 - 6$
$4 \times 8 = 40 - 8$
$5 \times 8 = \square - \square$
$6 \times 8 = \square - \square$
$7 \times 8 = \square - \square$
$13 \times 8 = \square - \square$

SPEED OF SOUND



Have you ever seen lightning before you heard its thunder? We often **see** something happen before we **hear** it. This is because light travels much faster than sound.

Speed of light .	300 000 kilometres per **second**
Speed of sound	1187 kilometres per **hour**

The speeds of supersonic aircraft are often given according to the speed of sound. A speed of Mach 1 is the speed of sound, Mach 2 is two times the speed of sound, Mach 3 is three times the speed of sound, and so on. Mach is the name of the scientist who made some important discoveries about sound.

1. How fast is A Mach 2? B Mach 3? C Mach 4?

2. The X-15 rocket plane can fly at speeds greater than Mach 5. How fast is Mach 5?

3. Some satellites travel at a speed that is about 23 times the speed of sound. How fast do they travel?

4. The earth travels in its orbit about the sun at a speed about 90 times the speed of sound. How fast does it travel?

5. The planet Mercury has an orbital speed that is about 146 times the speed of sound. How fast does Mercury travel in its orbit around the sun?

★ **6.** Light travels 1 071 360 000 kilometres per hour. How many kilometres per hour faster is the speed of light than the speed of sound?

Keeping in Touch with Addition, Subtraction, Multiplication, Division, Inequalities

1. Answer **T** (true) or **F** (false).

A $374\,652 > 374\,562$ C $921\,354 = 912\,354$ E $208\,302 < 208\,203$

B $483\,007 < 483\,010$ D $676\,767 > 767\,676$ F $543\,210 > 543\,120$

2. Match these.

A 6 less than 243 (Answer: c)	(a) $6 + 243$
B 243 divided by 6	(b) $6 - 243$
C 243 more than 6	(c) $243 \div 6$
D the product of 6 and 243	(d) $243 - 6$
E the difference of 243 and 6	(e) 6×243

3. Find the sums and differences.

A $\begin{array}{r}364\\287\\+521\\\hline\end{array}$ B $\begin{array}{r}614\\301\\+295\\\hline\end{array}$ C $\begin{array}{r}852\\361\\+725\\\hline\end{array}$ D $\begin{array}{r}916\\743\\+120\\\hline\end{array}$ E $\begin{array}{r}650\\843\\+921\\\hline\end{array}$

F $\begin{array}{r}7642\\-385\\\hline\end{array}$ G $\begin{array}{r}8603\\-105\\\hline\end{array}$ H $\begin{array}{r}7625\\-3468\\\hline\end{array}$ I $\begin{array}{r}9003\\-27\\\hline\end{array}$ J $\begin{array}{r}8080\\-808\\\hline\end{array}$

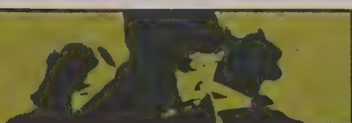
4. Find the products.

A Since $6 \times 9 = 54$, we know that $6 \times 90 = \boldsymbol{n}$.

B Since $8 \times 7 = 56$, we know that $80 \times 70 = \boldsymbol{n}$.

C Since $9 \times 8 = 72$, we know that $900 \times 8 = \boldsymbol{n}$.

D $\begin{array}{r}60\\\times 5\\\hline\end{array}$ E $\begin{array}{r}80\\\times 7\\\hline\end{array}$ F $\begin{array}{r}90\\\times 9\\\hline\end{array}$ G $\begin{array}{r}60\\\times 50\\\hline\end{array}$ H $\begin{array}{r}80\\\times 70\\\hline\end{array}$ I $\begin{array}{r}90\\\times 90\\\hline\end{array}$



You are invited to explore

ACTIVITY CARD 9
Page 351

The Great Lakes

Together the Great Lakes form the largest body of fresh water in the world.

Lake Michigan is the only lake that is entirely within the United States. The other four are shared by the United States and Canada.

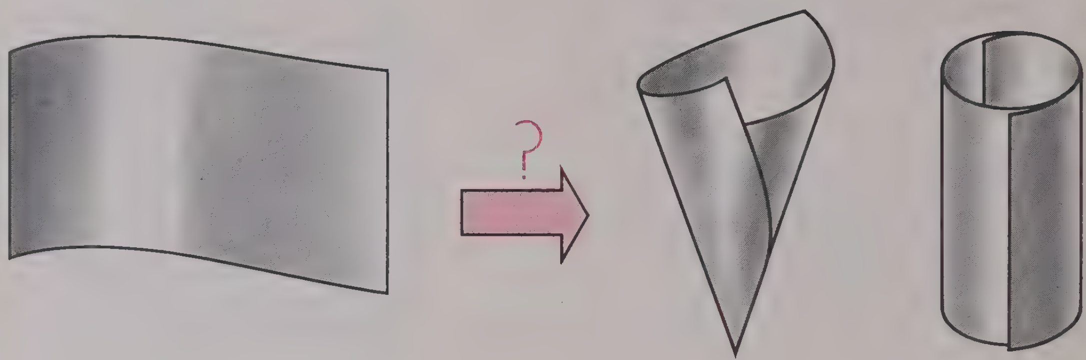
Lake	Length (km)	Greatest depth (m)	Area (km^2)
Superior	563	400	82 400
Michigan	494	277	58 000
Huron	331	225	59 600
Erie	388	63	25 700
Ontario	312	241	19 700

1. What is the area of Lake Erie and Lake Ontario together?
2. What is the area of Lake Superior, Lake Michigan, and Lake Huron together?
3. What is the total area of all five lakes?
4. How much greater is the area of Lake Huron than that of Lake Erie?
5. How much deeper is Lake Superior than Lake Huron?
6. The Nile River (world's longest) is about 21 times as long as Lake Ontario. About how long is the Nile?
7. The average depth of the Pacific Ocean is about 15 times as deep as the greatest depth of Lake Michigan. What is the average depth of the Pacific?
8. The distance around the earth is about 129 times the length of Lake Ontario. About how far is it around the earth?

9 Geometry

Let's explore cylinders and cones.

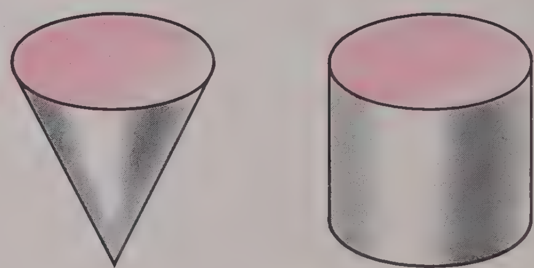
Investigating the Ideas



? Can you roll a sheet of paper into shapes like these?

Discussing the Ideas

We think of the cone and cylinder as having flat "lids" (shown in color).



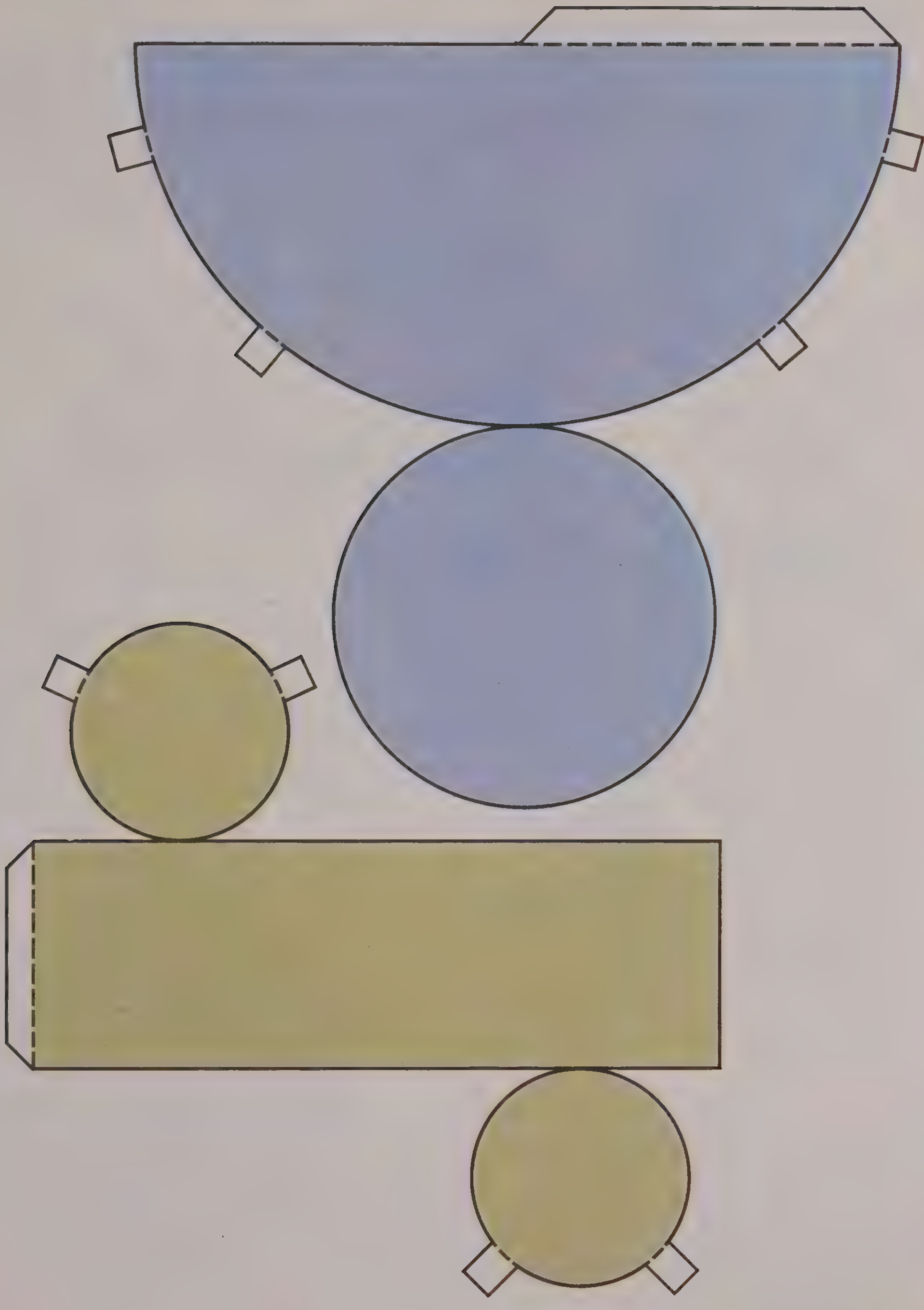
Cone Cylinder

1. What is the shape of each of the lids?

2. How many lids does it take to close the cone?

3. How many lids does it take to close the cylinder?

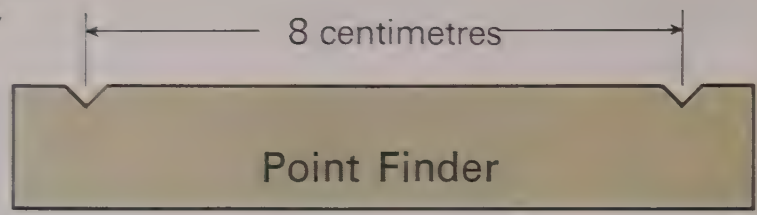
To make your own cylinder and cone,
trace and cut out these patterns.



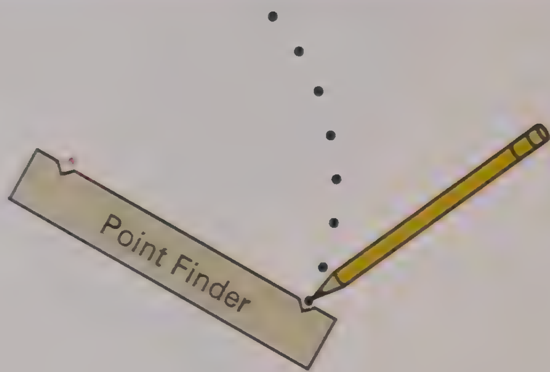
Let's explore circles.

Investigating the Ideas

Cut a "Point Finder" out of heavy paper.



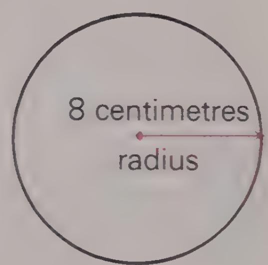
Use your Point Finder to mark **many** black dots all the way around a red dot.



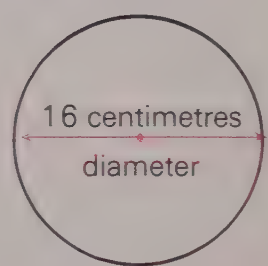
? Can you connect the black dots so that you have a **simple closed curve** that is always 8 centimetres from the red dot ?

Discussing the Ideas

1. In the Investigation you drew a **circle** with a **radius** of 8 centimetres. The red dot is the centre of the circle. What would the radius have been for a 10-centimetre Point Finder ?

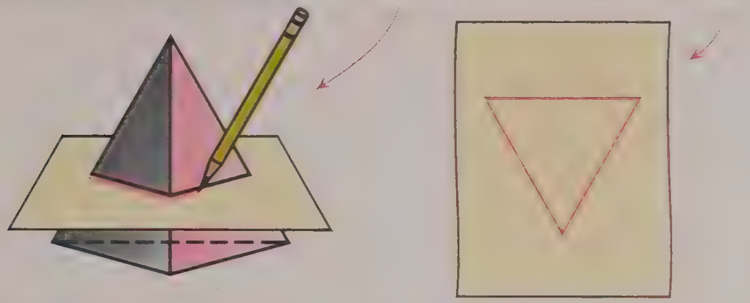


2. Your circle has a **diameter** of 16 centimetres. What would the diameter have been for a 10-centimetre Point Finder ?



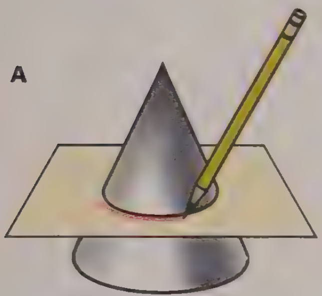
Using the Ideas

1. If you could cut the pyramid and mark your paper like this, you would get this.



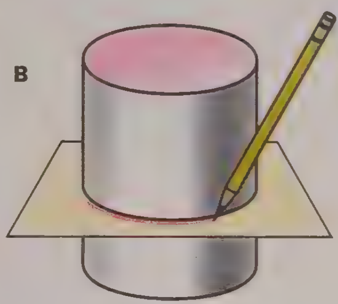
Draw what you would get for each of these cuts.

A



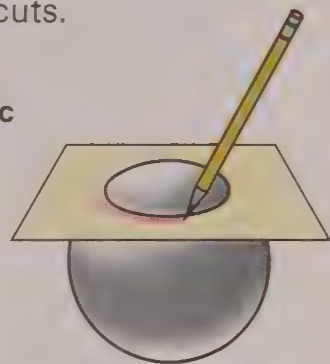
Cone

B



Cylinder

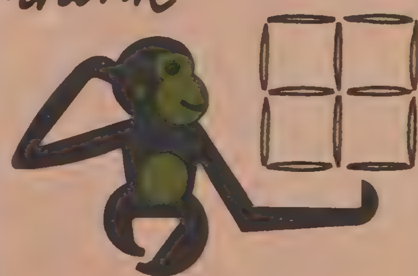
C



Ball

2. Trace and cut out this circle. See if you can find the centre by folding. Find the radius and the diameter.

think



Can you

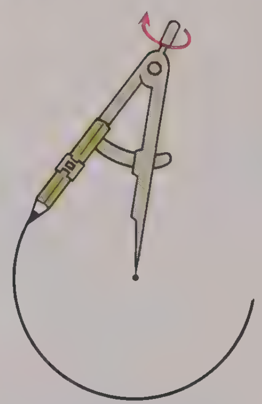
A remove 2 sticks and get 3 squares?

B remove 2 sticks and get 2 squares?

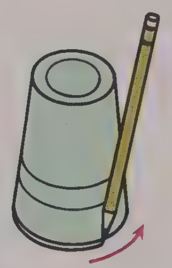
How can you draw circles?

Investigating the Ideas

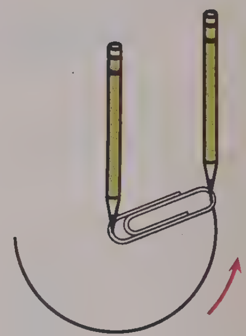
? Can you draw a circle by using each of these methods?



A compass



A round object



Two pencils and a paper clip

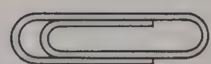
Discussing the Ideas

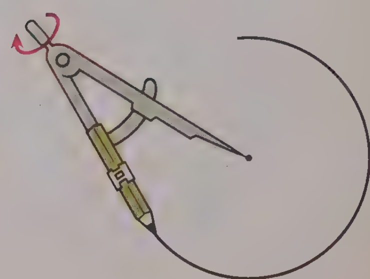
1. Which method above does not find the centre of the circle?

2. How is the paper-clip method like using your Point Finder?

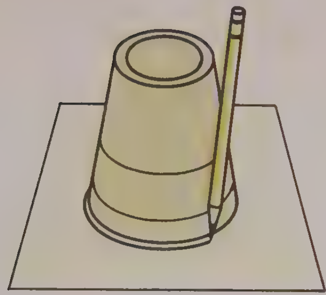
3. Use your compass or a paper clip to draw a circle. Explain how to find the radius and the diameter in centimetres.

Point Finder



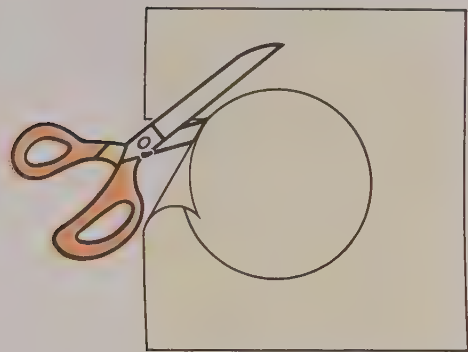


1. A Draw a circle by using a round object.

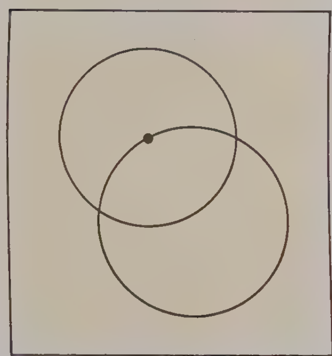


B Cut out the circle.

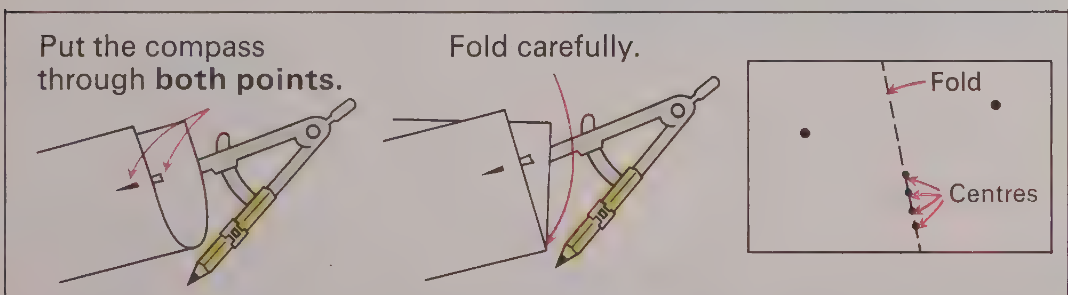
C Can you find the centre of the circle by folding your cutout ?



2. Mark a dot on your paper.
   - A Draw one circle so that the dot is the centre.
   - B Draw another circle so that the dot is on the circle.



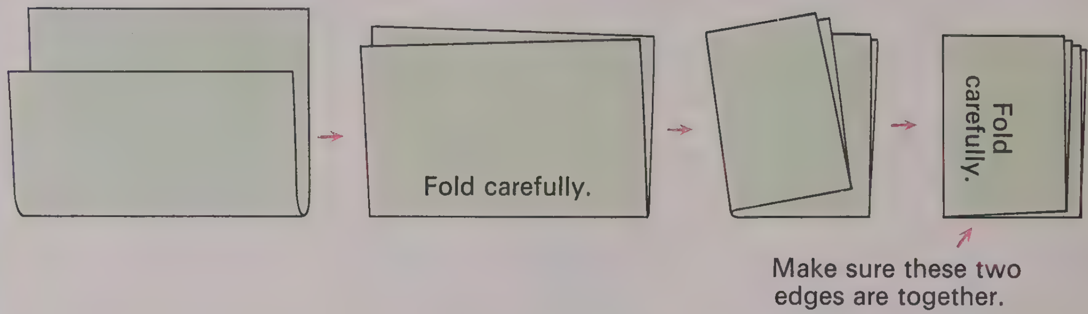
★ 3. Mark 2 points on your paper. Draw a circle through your 2 points by using this method.

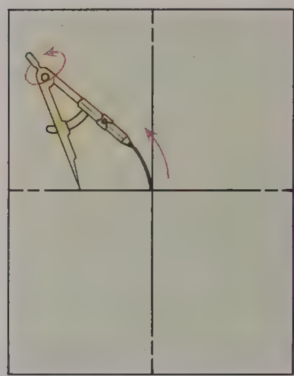


The centre of any circle through these two points is on the fold.

Investigating the Ideas

Follow the steps below to show lines that cross at right angles.





? Can you draw a circle that crosses one of the creases twice and touches the other at only one place?

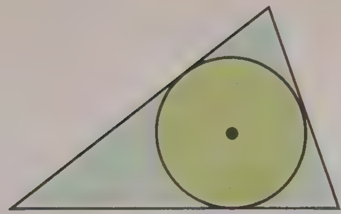
Discussing the Ideas

A line that touches a circle in exactly one point is a **tangent** to the circle.

1. Which crease is tangent to the circle you drew in the Investigation?

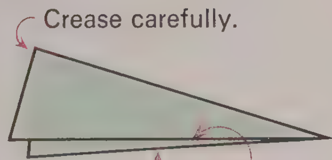
2. What are some things in the world around you that suggest the idea of a tangent?

1. A circle is **inscribed** in a triangle if each side of the triangle is tangent to the circle.



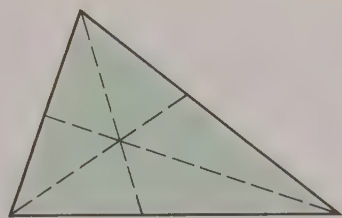
You can find the circle inscribed in a triangle in the following way.

A Draw and cut out a large triangle. The sides of your triangle should be at least 12 centimetres long.

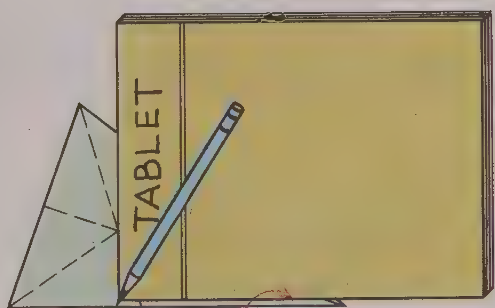


B Fold one corner of your triangle as shown in the figure.

C Now fold each of the other 2 corners as you did the first. If you did your work carefully, your triangle should look something like this. (The three creases should pass through one point.)



D Paste your triangle on another sheet of paper. Then use your tablet and mark the point right below the point where the folds intersect.

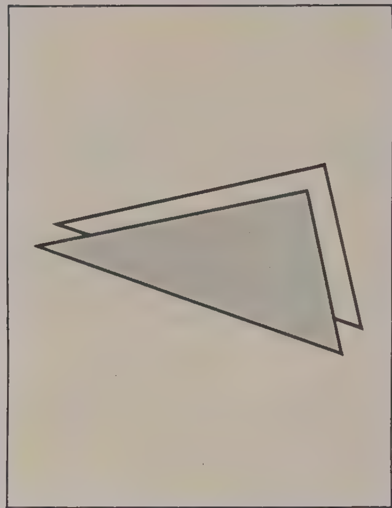


E Decide where to place your compass, and draw the circle inscribed in the triangle.

★ **2.** Draw a square. Figure out a way to draw the circle that is inscribed in the square.

Investigating the Ideas

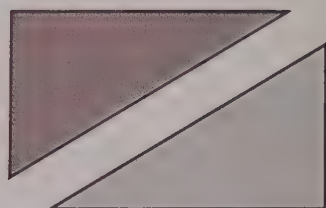
Draw a triangle on your paper.



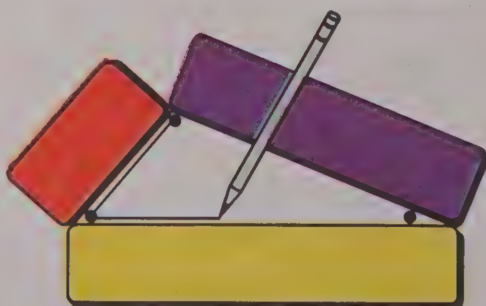
? Can you draw and cut out another triangle that will "fit exactly" on top of the first one?

Discussing the Ideas

Figures that "fit exactly" on one another are called **congruent** figures.



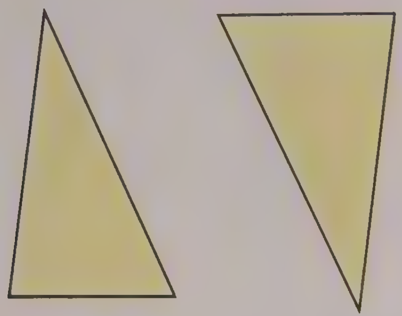
1. Explain how you might check to see if these two triangles are congruent.



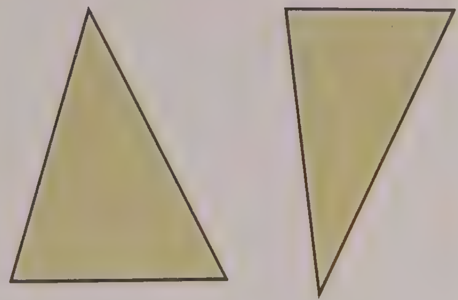
2. Suppose you use these strips to draw two different triangles. Would the triangles be congruent?

1. Tell "just by looking" which pairs of figures are not congruent.

A

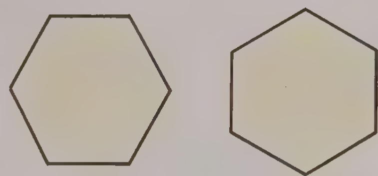


B

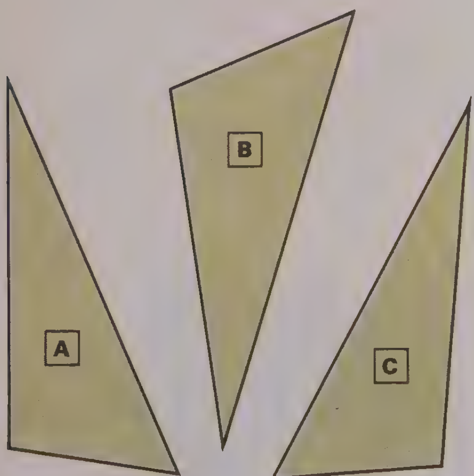


C

D

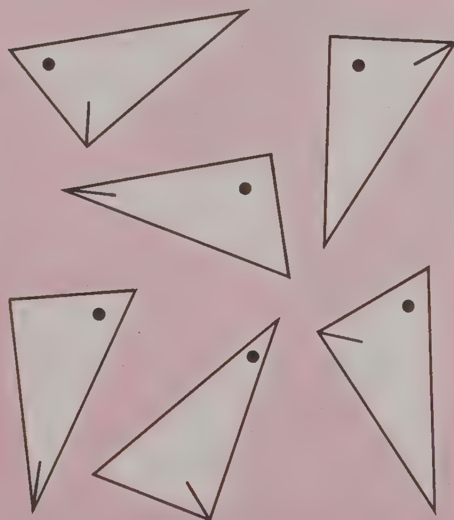


2. Use tracing to tell which two triangles are congruent.



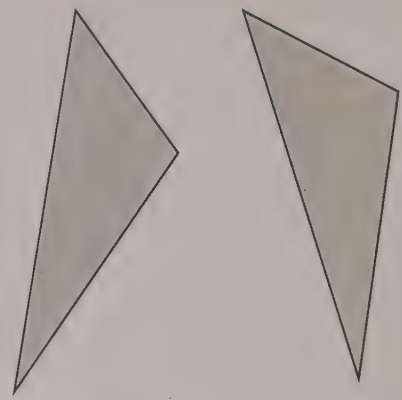
think

Which two are the same?



Investigating the Ideas

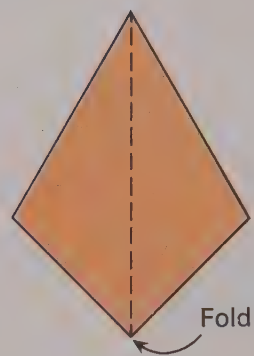
Cut out two triangles that are congruent.



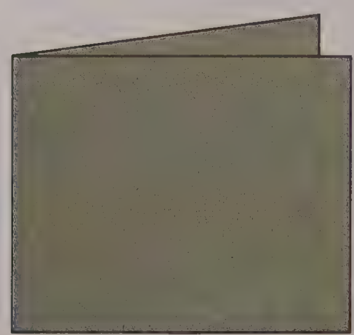
How many ways can you place the sides of your triangles together so that you get a symmetric figure?	Draw pictures to record your results.

Discussing the Ideas

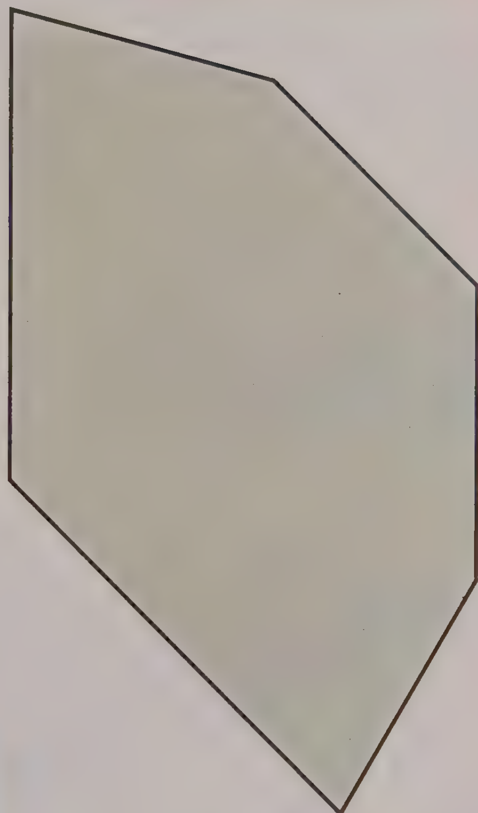
1. Suppose this figure is symmetric. Why do you think the two triangles are congruent?



2. Explain how you could use a folded piece of paper to cut out two congruent figures.

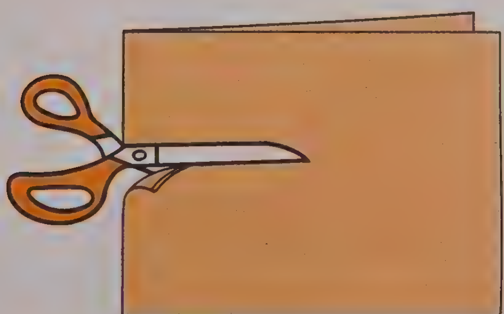


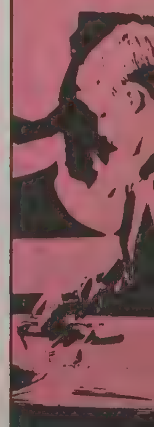
1. Trace this square and cut it out. Can you fold and cut so that you get
   - A two congruent triangles?
   - B two congruent rectangles?



2. Trace and cut out this figure. Can you find a way to fold and cut it so that you get two congruent quadrilaterals (4-sided figures)?

★ 3. Make two congruent pentagons (5-sided figures) by folding and cutting paper.





1. Answer **cone** or **cylinder** for each shape.

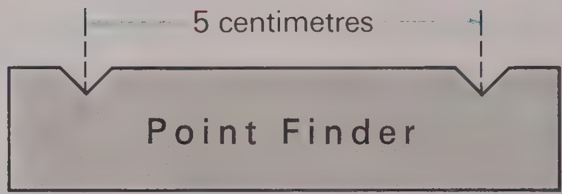
A

B

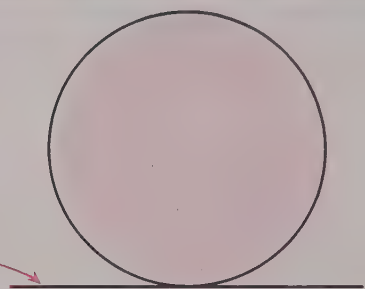
C

D

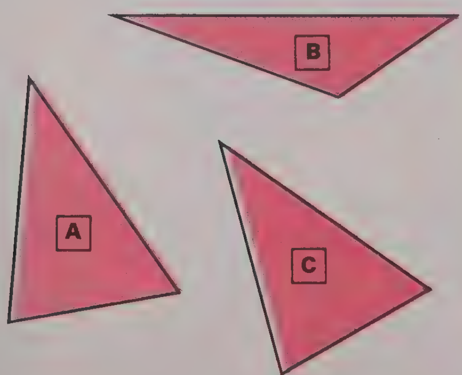
2. What would be the radius of a circle made with this Point Finder?



3. Use any method you want to draw a circle. Draw a line that is tangent to your circle.



4. Which two triangles appear to be congruent?



think

On the coldest day of the winter the temperature was 3 °C below zero. That same year the temperature got as high as 32 °C in the summer. What was the difference between the coldest and hottest temperature that year?

1. Find the sums and differences.

A $\begin{array}{r} 35 \\ +24 \\ \hline \end{array}$	B $\begin{array}{r} 78 \\ -46 \\ \hline \end{array}$	C $\begin{array}{r} 39 \\ +25 \\ \hline \end{array}$	D $\begin{array}{r} 62 \\ -48 \\ \hline \end{array}$	E $\begin{array}{r} 75 \\ -36 \\ \hline \end{array}$	F $\begin{array}{r} 57 \\ +9 \\ \hline \end{array}$
G $\begin{array}{r} 65 \\ +72 \\ \hline \end{array}$	H $\begin{array}{r} 134 \\ -91 \\ \hline \end{array}$	I $\begin{array}{r} 84 \\ +77 \\ \hline \end{array}$	J $\begin{array}{r} 126 \\ -58 \\ \hline \end{array}$	K $\begin{array}{r} 95 \\ +67 \\ \hline \end{array}$	L $\begin{array}{r} 160 \\ -84 \\ \hline \end{array}$

2. Find the products.

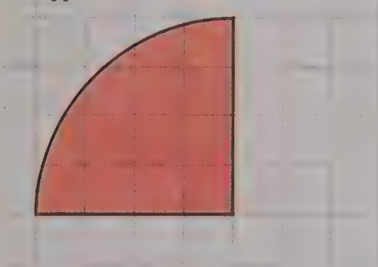
A 5×5	E 7×4	I 3×9	M 4×4	Q 6×2	U 5×4
B 2×8	F 2×9	J 6×6	N 6×5	R 8×9	V 8×5
C 9×6	G 5×7	K 0×7	O 8×4	S 9×1	W 5×9
D 9×4	H 7×2	L 4×6	P 6×8	T 7×7	X 8×8

3. Solve.

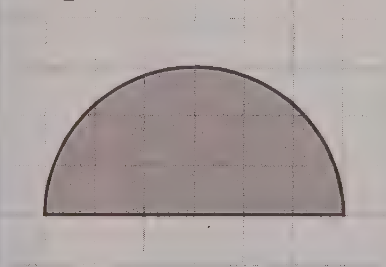
A $3 \times 100 = n$	C $100 \times 17 = b$	E $30 \times 40 = t$	G $200 \times 7 = e$
B $10 \times 56 = r$	D $28 \times 10 = g$	F $20 \times 70 = h$	H $8 \times 300 = m$

4. Estimate the area of each region.

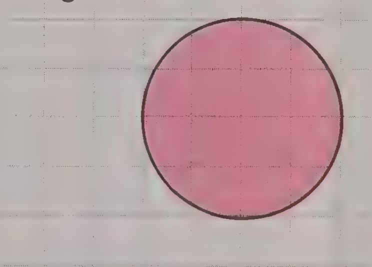
A

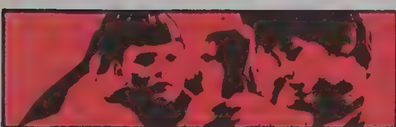


B



C





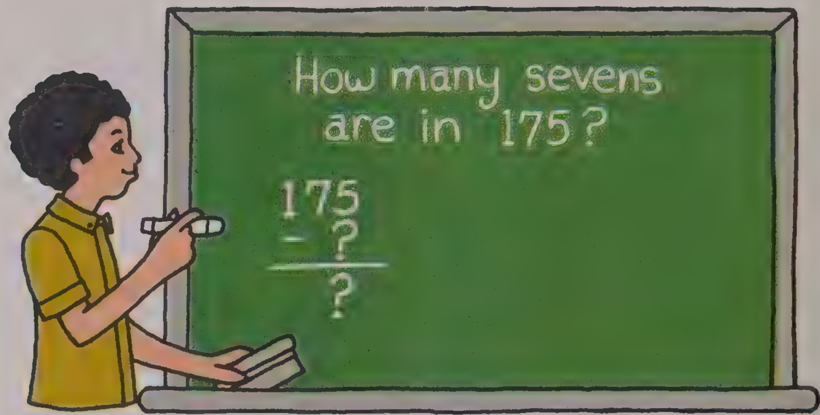
You are invited to explore

ACTIVITY CARD 10
Page 352

10 Dividing

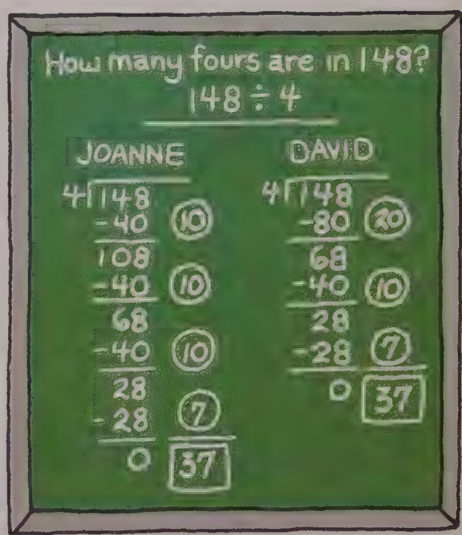
Can you find quotients by subtracting?

Investigating the Ideas



? Can you use subtraction to find how many sevens are in 175?

Discussing the Ideas



1. A How many sevens are in 175?
   B Solve: $175 \div 7 = n$

2. A Explain the steps Joanne used to find how many fours are in 148.
   B How is David's work shorter than Joanne's?
   C Solve: $148 \div 4 = n$

3. Try these on your own.
   A $138 \div 6$ B $204 \div 6$

1. Find the quotients. The numbers in the rings tell how many fives were subtracted each time.

A $115 \div 5$

$$\begin{array}{rl} 5\overline{)115} & \\ -50 & (10) \\ \hline 65 & \\ -50 & (10) \\ \hline 15 & \\ -15 & (3) \\ \hline 0 & \end{array}$$

B $230 \div 5$

$$\begin{array}{rl} 5\overline{)\ 230} & \\ -150 & (30) \\ \hline 80 & \\ -50 & (10) \\ \hline 30 & \\ -30 & (6) \\ \hline 0 & \end{array}$$

C $185 \div 5$

$$\begin{array}{rl} 5\overline{)\ 185} & \\ -100 & (20) \\ \hline 85 & \\ -50 & (10) \\ \hline 35 & \\ -35 & (7) \\ \hline 0 & \end{array}$$

2. Copy each exercise. Give the number of threes for each ring. Then give the quotient.

A $105 \div 3$

$$\begin{array}{rl} 3\overline{)105} & \\ -60 & (\ ) \\ \hline 45 & \\ -30 & (\ ) \\ \hline 15 & \\ -15 & (\ ) \\ \hline 0 & \end{array}$$

B $168 \div 3$

$$\begin{array}{rl} 3\overline{)168} & \\ -90 & (\ ) \\ \hline 78 & \\ -60 & (\ ) \\ \hline 18 & \\ -18 & (\ ) \\ \hline 0 & \end{array}$$

C $144 \div 3$

$$\begin{array}{rl} 3\overline{)144} & \\ -60 & (\ ) \\ \hline 84 & \\ -60 & (\ ) \\ \hline 24 & \\ -24 & (\ ) \\ \hline 0 & \end{array}$$

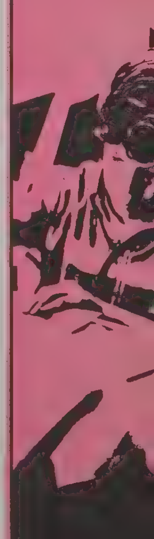
3. Use subtraction as in exercises 1 and 2 to help you find the quotient.

A $45 \div 3$
B $104 \div 4$
C $85 \div 5$
D $144 \div 6$
E $58 \div 2$
F $84 \div 4$
G $108 \div 3$
H $180 \div 5$
I $162 \div 6$
J $140 \div 4$
K $136 \div 8$
L $207 \div 9$

think

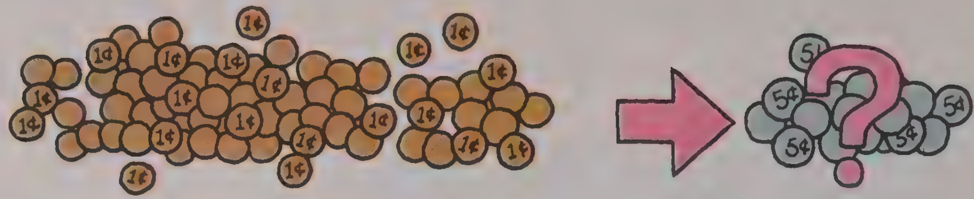
When dividing you must do,
I'm really your best bet.
If you'll keep using me,
The quotient you will get.

WHO AM I?



Let's explore quotients and remainders.

Investigating the Ideas



? Can you find the number of nickels you can get for 83 pennies?

Discussing the Ideas

Study this example to review the meaning of the words **divisor**, **quotient**, **dividend**, and **remainder**.

$$
\begin{array}{rrl}
 & 8 & \leftarrow \text{quotient} \\
\text{divisor} \rightarrow 6 & \overline{)50} & \leftarrow \text{dividend} \\
 & -48 & \\
 & \overline{2} & \leftarrow \text{remainder}
\end{array}
$$

1. In the Investigation you found how many fives are in 83. Was this number the quotient or the remainder?

2. Is the number of extra pennies the quotient or the remainder?

3. Dick and Jean were asked to find how many teams of 4 could be formed from 17 children.

- **A** Whose paper do you think is correct?
- **B** Name the divisor, quotient, dividend, and remainder on Jean's paper.

Dick

$$
\begin{array}{rr}
 & 3 \\
4 & \overline{)17} \\
 & -12 \quad 3 \\
 & \overline{5}
\end{array}
$$

There will be 3 teams and 5 extra children.

Jean

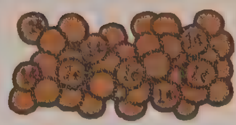
$$
\begin{array}{rr}
 & 4 \\
4 & \overline{)17} \\
 & -12 \quad 3 \\
 & \overline{5} \\
 & -4 \quad 1 \\
 & \overline{1}
\end{array}
$$

There will be 4 teams and 1 extra child.

4. Give the missing word.

If the dividing has been completed correctly, then the remainder is less than the __?__.

1. A How many nickels can you get for 47 pennies?
   B How many pennies will be left?



2. There were 49 boys at the park. If they were divided into baseball teams with 9 on a team,
   A how many teams could be made?
   B how many extras would there be?

3. A carton holds 6 bottles of soda.
   A How many cartons can you fill if you have 52 bottles?
   B How many extra bottles will there be?

4. The coach asked 45 boys to line up in rows of 7.
   A How many full rows did they make?
   B How many boys were left?

5. Kay has 59 stamps. She pasted 8 stamps in each row.
   A How many rows of 8 could she make?
   B How many extra stamps would she have to start another row?

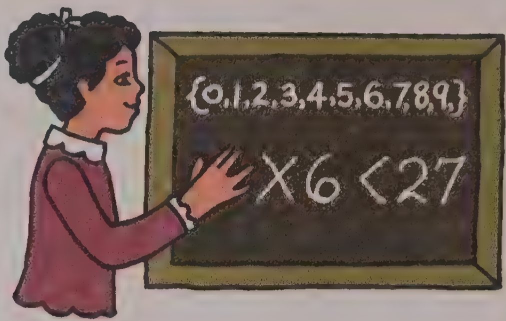
6. Copy each exercise. Find the quotient and the remainder.

A $6\overline{)40}$	B $3\overline{)23}$	C $2\overline{)17}$	D $5\overline{)27}$	E $4\overline{)33}$	F $6\overline{)39}$
G $8\overline{)62}$	H $7\overline{)41}$	I $9\overline{)58}$	J $4\overline{)31}$	K $8\overline{)55}$	L $9\overline{)63}$

7. Divide these numbers by 3 and list the remainders. 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30

8. List the possible remainders when any number is divided by 4.

Investigating the Ideas

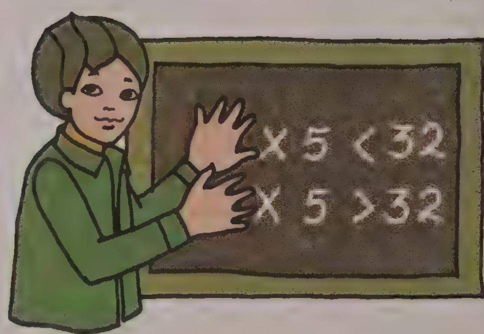


Gail

? Which numbers from the set do you think Gail might be covering?

Discussing the Ideas

1. A Which numbers were too large for Gail to be covering?
   B What is the largest number she could be covering? Is it the quotient for $6\overline{)27}$?



Dan

2. Dan is covering one of these pairs of numbers. $\begin{array}{cc} 5 & 6 \\ 6 & 7 \end{array}$
   A Which pair do you think Dan is covering?
   B What is the quotient for $5\overline{)32}$?

3. A Which pair $\begin{array}{c} 3 \\ 4 \end{array}$ or $\begin{array}{c} 4 \\ 5 \end{array}$ is correct for $\begin{array}{l} \square \times 4 < 18 \\ \square \times 4 > 18 \end{array}$?
   B What is the quotient for $4\overline{)18}$?

1. For each of parts **A** through **H**, copy the two inequalities. Use the correct number pair from those which follow. Then find the quotient and remainder.

Number pairs:	1	2	3	4	5	6	7	8	9
	2	3	4	5	6	7	8	9	10

Example:

$\square \times 4 < 17$
$\square \times 4 > 17$ → $4\overline{)17}$

Answer:

$4 \times 4 < 17$
$5 \times 4 > 17$ → $\begin{array}{r} 4 \\ 4\overline{)17} \\ \underline{16} \\ 1 \end{array}$

A $\square \times 5 < 47$; $\square \times 5 > 47$ → $5\overline{)47}$

B $\square \times 2 < 11$; $\square \times 2 > 11$ → $2\overline{)11}$

C $\square \times 3 < 26$; $\square \times 3 > 26$ → $3\overline{)26}$

D $\square \times 4 < 30$; $\square \times 4 > 30$ → $4\overline{)30}$

E $\square \times 6 < 27$; $\square \times 6 > 27$ → $6\overline{)27}$

F $\square \times 3 < 29$; $\square \times 3 > 29$ → $3\overline{)29}$

G $\square \times 7 < 46$; $\square \times 7 > 46$ → $7\overline{)46}$

H $\square \times 8 < 45$; $\square \times 8 > 45$ → $8\overline{)45}$

2. Find the **largest** whole number that will make the sentence true. Then copy the completed sentence. Find the quotient and remainder.

Example:

$n \times 5 < 37 \longrightarrow 5\overline{)37}$

Answer:

$7 \times 5 < 37 \longrightarrow \begin{array}{r} 7 \\ 5\overline{)37} \\ \underline{35} \\ 2 \end{array}$

A $n \times 5 < 43 \longrightarrow 5\overline{)43}$

B $n \times 3 < 22 \longrightarrow 3\overline{)22}$

C $n \times 4 < 35 \longrightarrow 4\overline{)35}$

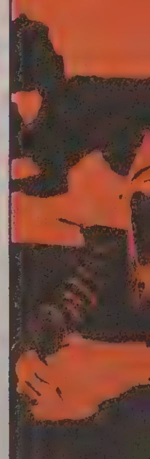
D $n \times 8 < 47 \longrightarrow 8\overline{)47}$

E $n \times 3 < 20 \longrightarrow 3\overline{)20}$

F $n \times 6 < 38 \longrightarrow 6\overline{)38}$

G $n \times 7 < 50 \longrightarrow 7\overline{)50}$

H $n \times 7 < 65 \longrightarrow 7\overline{)65}$



More practice, page A-21, Set 38

Discussing the Ideas

Copy the part of the example that says "write" as you work through the steps for finding 136 ÷ 4.

Step 1

Think

4)136
−80 ← 20 × 4
56

I can subtract 20 fours from 136.

Write

4)136
−80 20
56

Step 2

Think

4)136
−80 ← 20 × 4
56
−40 ← 10 × 4
16

I can subtract 10 more fours.

Write

4)136
−80 20
56
−40 10
16

Step 3

Think

34 ←
4)136
−80 ← 20 × 4
56
−40 ← 10 × 4
16
−16 ← 4 × 4
0

I can subtract 4 more fours.

Write

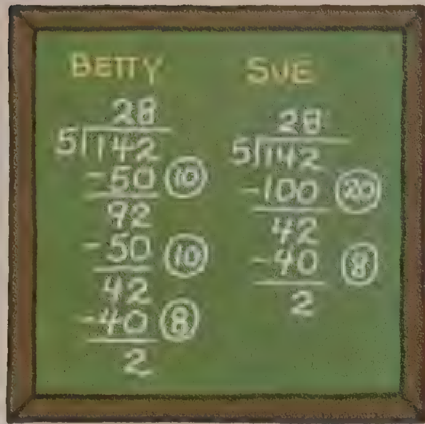
34
4)136
−80 20
56
−40 10
16
−16 4
0

1. Can you find the quotient 136 ÷ 4 by using subtractions different from those above?

2. Find the quotient 215 ÷ 5. Check your work with your teacher.

1. Betty and Sue each found the quotient and remainder for $142 \div 5$.

- **A** Did both girls get the same quotient?
- **B** How many fives did Betty subtract the first time?
- **C** How many fives did Sue subtract the first time?
- **D** Whose work is shorter?



2. Copy each exercise and give the missing numbers.

A
$$\begin{array}{rl} \square & \\ 4\overline{)152} & \\ -40 & (\square) \\ \hline 112 & \\ -40 & (\square) \\ \hline 72 & \\ -40 & (\square) \\ \hline 32 & \\ -32 & (\square) \\ \hline 0 & \end{array}$$

B
$$\begin{array}{rl} \square & \\ 4\overline{)152} & \\ -80 & (\square) \\ \hline 72 & \\ -40 & (\square) \\ \hline 32 & \\ -32 & (\square) \\ \hline 0 & \end{array}$$

C
$$\begin{array}{rl} \square & \\ 4\overline{)\ 152} & \\ -120 & (\square) \\ \hline 32 & \\ -32 & (\square) \\ \hline 0 & \end{array}$$

3. Did you get the same quotient for each part of exercise 2?

4. Find the quotients.

A $3\overline{)39}$	**B** $5\overline{)75}$	**C** $4\overline{)88}$	**D** $6\overline{)79}$
E $7\overline{)163}$	**F** $4\overline{)136}$	**G** $6\overline{)163}$	**H** $8\overline{)280}$
I $8\overline{)312}$	**J** $9\overline{)234}$	**K** $5\overline{)420}$	**L** $6\overline{)324}$
M $4\overline{)252}$	**N** $7\overline{)243}$	**O** $7\overline{)450}$	**P** $8\overline{)235}$

Investigating the Ideas

Are these inequalities correct?

$$\begin{cases} 40 \times 6 < 282 \\ 50 \times 6 > 282 \end{cases}$$

? Can you use the inequalities to help you find this quotient in the fewest number of steps?

$6\overline{)282}$

Discussing the Ideas

Give the number pair for each gray space. Then explain how to use your answer for your first quotient estimate.

Number pairs:

10	20	30	40	50	60	70	80	90
20	30	40	50	60	70	80	90	100

1. $\square \times 4 < 128$, $\square \times 4 > 128$ → $4\overline{)128}$

2. $\square \times 5 < 325$, $\square \times 5 > 325$ → $5\overline{)325}$

3. $\square \times 3 < 264$, $\square \times 3 > 264$ → $3\overline{)264}$

4. $\square \times 4 < 132$, $\square \times 4 > 132$ → $4\overline{)132}$

5. $\square \times 9 < 162$, $\square \times 9 > 162$ → $9\overline{)162}$

6. $\square \times 8 < 608$, $\square \times 8 > 608$ → $8\overline{)608}$

1. From the set {10, 20, 30, 40, 50, 60, 70, 80, 90}, find the **largest** number that will make each sentence true.

A $n \times 4 < 128$ (Answer: $30 \times 4 < 128$)
B $n \times 4 < 92$
C $n \times 3 < 96$
D $n \times 7 < 189$
E $n \times 6 < 258$
F $n \times 7 < 448$
G $n \times 8 < 272$
H $n \times 9 < 387$
I $n \times 5 < 390$
J $n \times 7 < 546$
K $n \times 8 < 456$
L $n \times 7 < 294$
M $n \times 6 < 510$

2. Copy the problem. Complete the work of finding the quotient and remainder.

A
```
     ▯▯
 8) 304
   -240  (30)
```
B
```
     ▯▯
 5) 327
   -300  (60)
```
C
```
     ▯▯
 9) 513
   -450  (50)
```
D
```
     ▯▯
 6) 294
   -240  (40)
```

3. Copy each exercise and write the correct digits instead of the ▯.

A
```
     ▯▯
 5) 213
   -▯▯▯  (40)
     ▯▯
    -▯▯  (▯)
      ▯
```
B
```
     ▯▯
 7) 612
   -▯▯▯  (80)
     ▯▯
    -▯▯  (▯)
      ▯
```
C
```
     ▯▯
 4) 156
   -▯▯▯  (30)
     ▯▯
    -▯▯  (▯)
      ▯
```
D
```
     ▯▯
 8) 435
   -▯▯▯  (50)
     ▯▯
    -▯▯  (▯)
      ▯
```

4. Find the quotients and remainders.

A $3\overline{)66}$
B $4\overline{)94}$
C $7\overline{)189}$
D $4\overline{)97}$
E $8\overline{)424}$
F $5\overline{)494}$
G $7\overline{)462}$
H $6\overline{)513}$
I $9\overline{)234}$
J $4\overline{)370}$

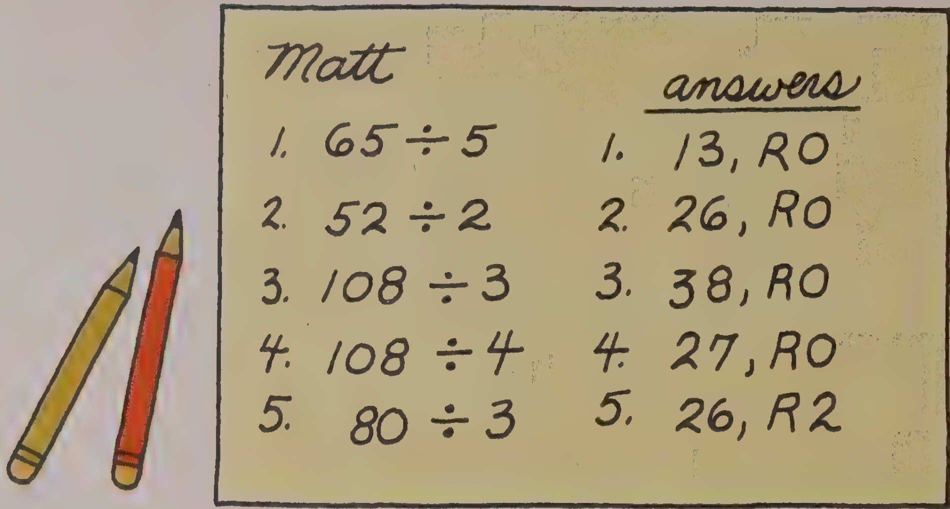
think

In the A figure below, the ▯ covers the same digit. What is this digit? What digit is covered by the ▯ in B?

A
```
   ▯1
 × ▯
 2▯▯
```
B
```
   ▯1
 × ▯
 3▯▯
```

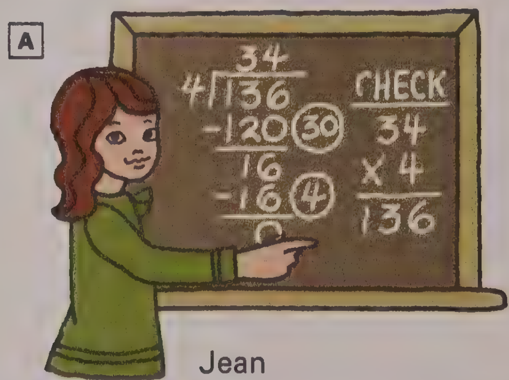
More practice, page A-21, Set 39

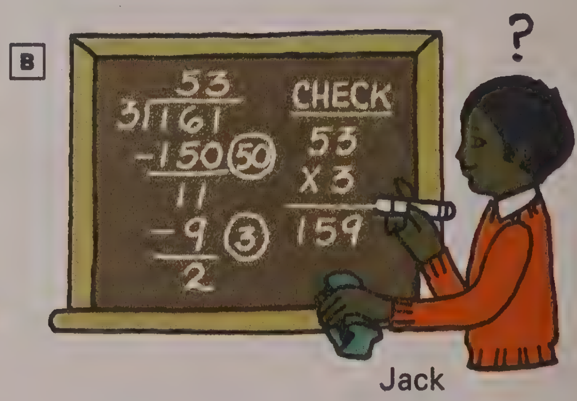
Investigating the Ideas



Can you use multiplication to help you grade Matt's paper? (**R** stands for remainder.)

Discussing the Ideas





1. Jean checked problem A by multiplying. How did she know her quotient was correct?

2. Jack checked problem B. His product was 159. He thought it should be 161. Explain how Jack can finish checking.

1. From {10, 20, 30, 40, 50, 60, 70, 80, 90}, find the largest number that will make each sentence true.
   - A Since $6 \times 4 < 25$, we know that $n \times 4 < 256$.
   - B Since $5 \times 3 < 16$, we know that $n \times 3 < 164$.
   - C Since $8 \times 7 < 59$, we know that $n \times 7 < 595$.
   - D Since $7 \times 6 < 43$, we know that $n \times 6 < 439$.
   - E Since $9 \times 6 < 55$, we know that $n \times 6 < 554$.
   - F Since $9 \times 8 < 74$, we know that $n \times 8 < 748$.
   - G Since $9 \times 9 < 83$, we know that $n \times 9 < 837$.

2. Find the quotients and remainders. Check each exercise. Exercise 1 should help you.

A $4\overline{)256}$	B $3\overline{)164}$	C $7\overline{)595}$	D $6\overline{)439}$	E $2\overline{)92}$
F $5\overline{)135}$	G $6\overline{)554}$	H $8\overline{)748}$	I $9\overline{)837}$	J $7\overline{)656}$

3. Find the quotients and remainders. Check each exercise.

A $5\overline{)305}$	B $3\overline{)249}$	C $4\overline{)85}$	D $7\overline{)327}$	E $8\overline{)363}$
F $9\overline{)605}$	G $3\overline{)288}$	H $7\overline{)620}$	I $2\overline{)179}$	J $5\overline{)385}$
K $8\overline{)603}$	L $4\overline{)312}$	M $9\overline{)506}$	N $7\overline{)523}$	O $8\overline{)536}$

think

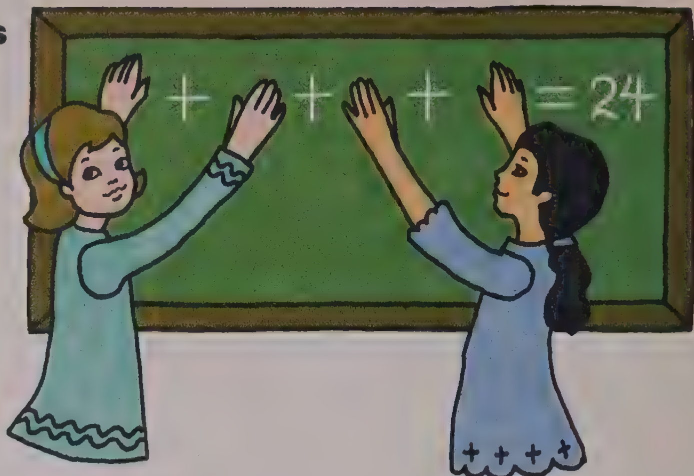
Find the digit for each ▥. Find as many of the other digits as you can.

1.
$$\begin{array}{r} \text{x▥} \\ 8\overline{)\ 2\text{xx}} \\ \underline{-\text{xxx}} \\ 1\text{x} \\ \underline{-\text{xx}} \\ 0 \end{array}$$

2.
$$\begin{array}{r} 3\text{x} \\ \text{x}\overline{)\ 31\text{x}} \\ \underline{-\text{▥}7\text{x}} \\ \text{xx} \\ \underline{-\text{xx}} \\ 2 \end{array}$$

More practice, page A-22, Set 40

Investigating the Ideas



Pam Julie

Pam and Julie are covering 4 addends. Find 4 numbers (not all the same) they **might** be covering.

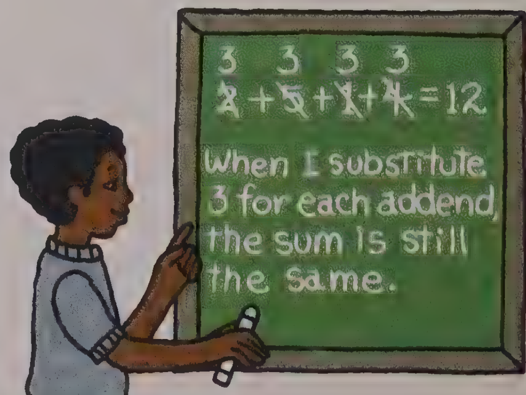
? Can you find the hidden numbers if they are all the same?

Discussing the Ideas

1. A Will the numbers in this set ⟶ {7, 4, 8, 5} work in the example above?
   B We say that the **average** of the numbers in this set of numbers is 6. What is special about the number 6 with respect to this set?

2. Look at Don's example. What is the average of the numbers in {2, 5, 1, 4}?

3. Can you find a "substitute" (the average) for the addends in each?
   A $4 + 5 + 9 = 18$
   B $5 + 7 + 12 + 8 = 32$
   C $10 + 5 + 6 = 21$



Don

1. Find the "substitute" for the addends. Then give the average of the addends.

A $4 + 3 + 8 = 15$ (Answer: $\overset{5}{\cancel{4}} + \overset{5}{\cancel{3}} + \overset{5}{\cancel{8}} = 15$ The average is 5.)

B $10 + 4 = 14$	E $12 + 18 = 30$
C $6 + 4 + 5 = 15$	F $2 + 3 + 10 + 9 + 11 = 35$
D $3 + 7 + 6 + 4 = 20$	G $12 + 14 + 7 = 33$

2. Find the "substitute" for the numbers in each set. Then give the average of the numbers in the set.

A {2, 10} (Answer: $\overset{6}{\cancel{2}} + \overset{6}{\cancel{10}} = 12$ The average is 6.)

B {1, 2, 6}	D {6, 13, 11}	F {7, 17}	H {73, 80, 93}
C {2, 5, 4, 5}	E {6, 9, 13, 8}	G {60, 74}	I {72, 53, 68, 71}

3. Here is a list of points Jim scored in each of 3 basketball games. Give the **average** number of points scored.

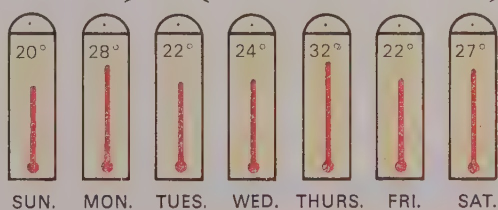
Game 1	Game 2	Game 3
12	7	11

4. Here are Jane's spelling scores for one week. Find the average of her scores.

5. For each exercise, find the average of the numbers in the set.

A {3, 7, 5, 5}	D {15, 21}	G {21, 34, 44}	J {9, 8, 7, 6, 5, 4, 3}
B {8, 12, 7}	E {34, 42}	H {62, 79, 87}	K {81, 82, 91, 78}
C {4, 3, 5, 4}	F {93, 97}	I {52, 56, 51}	L {91, 68, 75, 84, 52}

6. The Celsius thermometers show the temperature for each day during one week. Give the average of these temperatures.



More practice, page A-22, Set 41

Let's explore 3-digit quotients.

Discussing the Ideas

1. Study this example.

Think:

$$\begin{array}{rl} 324 & \\ 6\overline{)1944} & \\ \underline{1800} & \leftarrow 300 \times 6 \\ 144 & \\ \underline{120} & \leftarrow 20 \times 6 \\ 24 & \\ \underline{24} & \leftarrow 4 \times 6 \\ 0 & \end{array}$$

Since $300 \times 6 < 1944$
$400 \times 6 > 1944$,
we can subtract **300** sixes from 1944. Then we can subtract **20** more sixes. Finally, we can subtract **4** more sixes. The quotient is 324.

Write:

$$\begin{array}{rl} 324 & \\ 6\overline{)1944} & \\ \underline{1800} & 300 \\ 144 & \\ \underline{120} & 20 \\ 24 & \\ \underline{24} & 4 \\ 0 & \end{array}$$

Now find this quotient on your own.

$400 \times 3 < 1368$
$500 \times 3 > 1368$

$3\overline{)1368}$

2. Explain how you can use the inequalities to help you find your first quotient estimate.

3. From {100, 200, 300, 400, . . .}, find the largest multiple of 100 for n. $n \times 4 < 1384$
Then find this quotient. $4\overline{)1384}$

4. Explain how the inequality helped you find your first quotient estimate.

1. Find the correct number pair.
Then find the quotient and remainder.

Number pairs:	100	200	300	400	500	600	700	800	900
	200	300	400	500	600	700	800	900	1000

A $\square \times 6 < 1944$, $\square \times 6 > 1944 \rightarrow 6\overline{)1944}$

B $\square \times 3 < 711$, $\square \times 3 > 711 \rightarrow 3\overline{)711}$

C $\square \times 5 < 643$, $\square \times 5 > 643 \rightarrow 5\overline{)643}$

D $\square \times 4 < 2437$, $\square \times 4 > 2437 \rightarrow 4\overline{)2437}$

E $\square \times 2 < 1715$, $\square \times 2 > 1715 \rightarrow 2\overline{)1715}$

F $\square \times 7 < 2462$, $\square \times 7 > 2462 \rightarrow 7\overline{)2462}$

G $\square \times 8 < 3847$, $\square \times 8 > 3847 \rightarrow 8\overline{)3847}$

H $\square \times 9 < 5964$, $\square \times 9 > 5964 \rightarrow 9\overline{)5964}$

I $\square \times 4 < 3143$, $\square \times 4 > 3143 \rightarrow 4\overline{)3143}$

J $\square \times 5 < 4987$, $\square \times 5 > 4987 \rightarrow 5\overline{)4987}$

2. Find the **largest** number from {100, 200, . . .}, that will make the sentence true. Then find the quotient and remainder.

A $n \times 6 < 1944 \rightarrow 6\overline{)1944}$

B $n \times 3 < 1624 \rightarrow 3\overline{)1624}$

C $n \times 6 < 2578 \rightarrow 6\overline{)2578}$

D $n \times 4 < 2713 \rightarrow 4\overline{)2713}$

E $n \times 5 < 4316 \rightarrow 5\overline{)4316}$

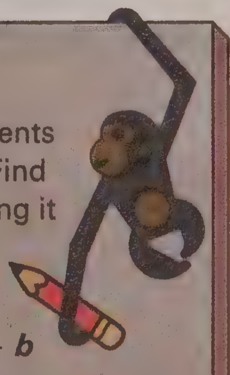
F $n \times 8 < 6845 \rightarrow 8\overline{)6845}$

G $n \times 7 < 6425 \rightarrow 7\overline{)6425}$

H $n \times 3 < 1369 \rightarrow 3\overline{)1369}$

think

Each letter represents a different digit. Find that digit, assuming it is not 0.



1. $a \times a = a$
2. $b \times b = 20 + b$
3. $c \times c = 30 + c$

More practice, page A-23, Set 42

Let's practice dividing.

1. Find the largest number from {100, 200, 300, 400, 500, 600, 700, 800, 900}, that will make each sentence true.
Then find the quotient and remainder.

A Since $4 \times 3 < 14$, we know that $n \times 3 < 1461$ $\longrightarrow$ $3\overline{)1461}$

B Since $3 \times 9 < 29$, we know that $n \times 9 < 2943$. $\longrightarrow$ $9\overline{)2943}$

C Since $5 \times 8 < 42$, we know that $n \times 8 < 4296$. $\longrightarrow$ $8\overline{)4296}$

D Since $5 \times 2 < 11$, we know that $n \times 2 < 1126$. $\longrightarrow$ $2\overline{)1126}$

E Since $8 \times 6 < 51$, we know that $n \times 6 < 5118$. $\longrightarrow$ $6\overline{)5118}$

F Since $6 \times 4 < 27$, we know that $n \times 4 < 2788$. $\longrightarrow$ $4\overline{)2788}$

G Since $9 \times 7 < 67$, we know that $n \times 7 < 6776$. $\longrightarrow$ $7\overline{)6776}$

H Since $6 \times 8 < 55$, we know that $n \times 8 < 5584$. $\longrightarrow$ $8\overline{)5584}$

I Since $7 \times 9 < 65$, we know that $n \times 9 < 6538$. $\longrightarrow$ $9\overline{)6538}$

J Since $9 \times 4 < 39$, we know that $n \times 4 < 3966$. $\longrightarrow$ $4\overline{)3966}$

K Since $8 \times 3 < 25$, we know that $n \times 3 < 2575$. $\longrightarrow$ $3\overline{)2575}$

L Since $9 \times 5 < 46$, we know that $n \times 5 < 4646$. $\longrightarrow$ $5\overline{)4646}$

2. Find the quotients and remainders. Check each exercise.

A $3\overline{)396}$ H $9\overline{)3627}$

B $2\overline{)1846}$ I $5\overline{)3360}$

C $9\overline{)2727}$ J $8\overline{)5002}$

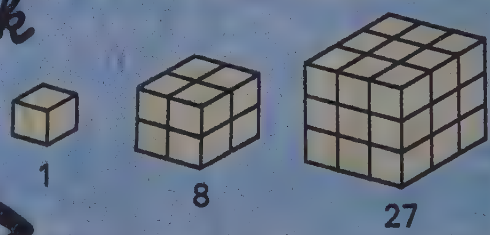
D $5\overline{)1600}$ K $7\overline{)2975}$

E $4\overline{)3243}$ L $3\overline{)2862}$

F $6\overline{)5208}$ M $7\overline{)4100}$

G $5\overline{)4008}$ N $6\overline{)1459}$

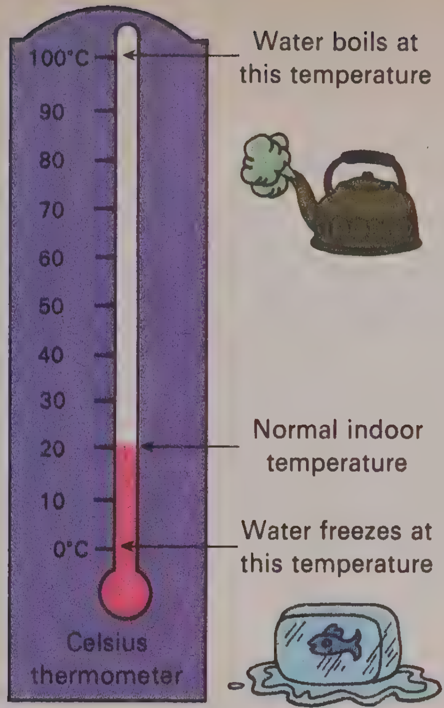
think



These numbers are "cubes." Do you see why? Can you find the next two numbers which are cubes?

Solving Story Problems

TEMPERATURE



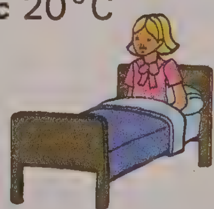
A **thermometer** is used to measure temperature. The unit used in most of the world to measure how hot or cold it is is the **degree Celsius.** On the Celsius thermometer normal body temperature is 37 °C (read 37 **degrees Celsius**); normal room temperature is 20 °C.

1. On the Celsius thermometer what is the boiling point of water ? the freezing point of water ?

2. How many degrees Celsius greater is the boiling point of water than the freezing point of water ?

3. Which of the following temperatures best describes a hot summer day in your town ? A 5 °C B 30 °C C 110 °C

4. If it were snowing outside, which of the following would best describe the temperature ? A 0 °C B 10 °C C 20 °C



5. If you were sick and had a fever, which of the following would best describe your temperature ? A 100° B 70 °C C 40 °C

6. Which of the following best describes the temperature in your classroom ? A 10 °C B 20 °C C 30 °C

Keeping in Touch with

Addition
Subtraction
Multiplication
Measurement
Place value

1. Give the correct number for each red digit.
In exercise A the 8 means 8000.

A 4 378 615
B 64 124 752
C 6 389 741
D 3 026 518
E 4 250 697
F 97 643 287

2. Find the sums, differences, and products.

A $\begin{array}{r} 6728 \\ +9357 \\ \hline \end{array}$ B $\begin{array}{r} 8436 \\ -2759 \\ \hline \end{array}$ C $\begin{array}{r} 432 \\ \times 65 \\ \hline \end{array}$ D $\begin{array}{r} 8463 \\ +9287 \\ \hline \end{array}$ E $\begin{array}{r} 7062 \\ -888 \\ \hline \end{array}$

F $\begin{array}{r} 745 \\ \times 63 \\ \hline \end{array}$ G $\begin{array}{r} 8469 \\ +7531 \\ \hline \end{array}$ H $\begin{array}{r} 8002 \\ -6457 \\ \hline \end{array}$ I $\begin{array}{r} 846 \\ \times 352 \\ \hline \end{array}$ J $\begin{array}{r} 764 \\ \times 803 \\ \hline \end{array}$

★ **3.** Look at the red segment and its length. Then use that length to estimate the lengths of the other segments.

5

A

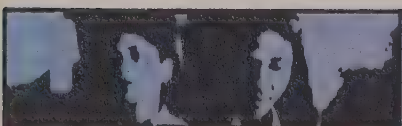
B

C

D

E

★ **4.** Look at the red figure and its area. Then use that area to estimate the areas of the other figures.



You are invited to explore

ACTIVITY CARD 11
Page 352

Solving Story Problems *New Brunswick and the Yukon*

	New Brunswick	Yukon
Area	72 586 km^2	530 114 km^2
Population (1971 census)	634 557	18 338
Average temperature	4 °C (Fredericton)	-5 °C (Whitehorse)
Highest point	Mt. Carleton 807 metres	Mt. Logan 5955 metres

1. How many more square kilometres are in the Yukon than in New Brunswick ?

2. A How many more people lived in New Brunswick than in the Yukon in 1971 ?
B How many lived in the two areas together ?

3. Mt. Logan is the highest point in Canada. Mt. McKinley is the highest point in North America. Mt. McKinley is 6096 metres high. How much higher is Mt. McKinley than Mt. Logan ?

★ **4.** Ontario is approximately two times the size of the Yukon. What is the approximate area of Ontario ?

Discussing the Ideas

1. A What is the number for n? $n \times 30 = 150$

   B How many thirties in 150? $30\overline{)150}$

2. How can you find how many thirties are in 1500? $30\overline{)1500}$
   Check your answer by using multiplication.

3. Study the example below.

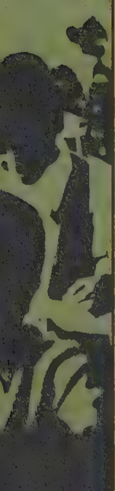
Think:		Write:
$\begin{array}{r} 4 \\ 70\overline{)305} \\ -280 \\ \hline 25 \end{array}$ $\leftarrow 4 \times 70$	Since $4 \times 70 < 305$, $5 \times 70 > 305$, we can subtract 4 seventies from 305. The quotient is 4. The remainder is 25.	$\begin{array}{r} 4 \\ 70\overline{)305} \\ 280 \\ \hline 25 \end{array}$ 4

Use the method above to find the quotient and remainder in this problem. Check your answer with your teacher. $60\overline{)463}$

4. Study the example below.

Think:		Write:
$\begin{array}{r} 89 \\ 70\overline{)6230} \\ 5600 \\ \hline 630 \\ 630 \\ \hline 0 \end{array}$ $\leftarrow 80 \times 70$, $\leftarrow 9 \times 70$	Since $80 \times 70 < 6230$, $90 \times 70 > 6230$, we can subtract **80** seventies from 6230. Then we can subtract **9** more seventies. The quotient is **89**.	$\begin{array}{r} 89 \\ 70\overline{)6230} \\ 5600 \\ \hline 630 \\ 630 \\ \hline 0 \end{array}$ 80, 9

Use the method above to find the quotient and remainder in this problem. $80\overline{)5920}$



1. For each exercise, when you find the largest whole number that makes the sentence true, you will have found the quotient. Write the quotient and remainder for each division problem.

A $\square \times 30 < 192$
$30\overline{)192}$

B $\square \times 60 < 317$
$60\overline{)317}$

2. Find the quotients and remainders.

A $20\overline{)190}$ B $30\overline{)180}$ C $40\overline{)297}$ D $70\overline{)220}$

E $80\overline{)230}$ F $50\overline{)415}$ G $70\overline{)579}$ H $40\overline{)317}$

3. The largest number in {10, 20, 30, 40, . . .} that makes the sentence true is the quotient. Find the quotient and remainder for each division problem.

A $\square \times 30 < 627$
$30\overline{)627}$

B $\square \times 20 < 1406$
$20\overline{)1406}$

4. Find the quotients and remainders.

A $30\overline{)1200}$ B $20\overline{)816}$

C $40\overline{)2036}$ D $50\overline{)2536}$

E $20\overline{)1808}$ F $40\overline{)2835}$

G $90\overline{)5472}$ H $60\overline{)4231}$

I $30\overline{)690}$ J $70\overline{)2240}$

K $50\overline{)3200}$ L $40\overline{)2640}$

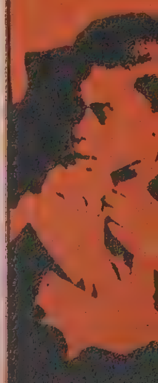
M $80\overline{)5200}$ N $70\overline{)5670}$

think

Trace and cut out 4 of these.

How many different shapes can you make by placing "like" edges together? Here are a few.

Draw your findings on graph paper.



Investigating the Ideas

You know how to find this quotient.

$$\begin{array}{r l}
47 \text{ R } 13 & \\
30\overline{)1423} & \\
1200 & \leftarrow 40 \times 30 \quad 40 \\
\hline
223 & \\
210 & \leftarrow 7 \times 30 \quad 7 \\
\hline
13 &
\end{array}$$

? Can you find these quotients? $32\overline{)1423}$ and $27\overline{)1423}$

Discussing the Ideas

1. Explain why one of the quotients in the Investigation is more than 47 and the other is less.

2. How would you improve Dick's method of finding how many forty-ones in 258?

3. Explain how the examples below can help you with your first quotient estimate.

Dick

$$\begin{array}{r l}
6 & \\
41\overline{)258} & \\
82 & 2 \\
\hline
176 & \\
82 & 2 \\
\hline
94 & \\
82 & 2 \\
\hline
12 &
\end{array}$$

A Think: $n \times 20 < 624$

$n \times 21 < 624$

$21\overline{)624}$

B Think: $n \times 60 < 1357$

$n \times 59 < 1357$

$59\overline{)1357}$

Find the quotients and remainders.

1. $21\overline{)126}$	**2.** $41\overline{)175}$	**3.** $52\overline{)156}$	**4.** $59\overline{)192}$
5. $69\overline{)560}$	**6.** $21\overline{)630}$	**7.** $59\overline{)1357}$	**8.** $42\overline{)1050}$
9. $38\overline{)2014}$	**10.** $51\overline{)3417}$	**11.** $31\overline{)372}$	**12.** $42\overline{)966}$
13. $54\overline{)1674}$	**14.** $87\overline{)3262}$	**15.** $26\overline{)832}$	**16.** $91\overline{)1911}$
17. $78\overline{)1560}$	**18.** $69\overline{)2415}$	**19.** $72\overline{)3456}$	**20.** $88\overline{)4084}$

Short Picture Problems

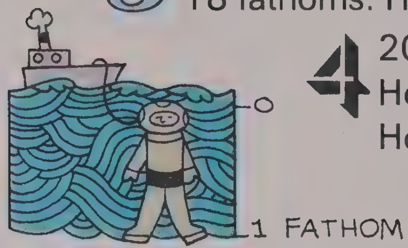
More practice, page A-24, Set 44

Short Stories

1 60 minutes → 1 hour.
180 minutes. How many hours ?

2 260 minutes. How many full hours ? How many extra minutes ?

3 1 fathom ⟶ about 2 metres.
18 fathoms. How many metres ?

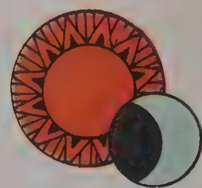


4 200 days.
How many weeks ?
How many extra days ?

5 1 coffee urn ⟶ 12 cups of coffee.
72 cups needed. How many urns ?

6 Relay team ⟶ 4 runners.
112 runners.
How many teams ?

7 12 flowers ⟶ 1 dozen.
One bush: 72 flowers.
How many dozen ?



8 24 hours → 1 day.
198 hours. How many full days ?
How many extra hours ?

9 365 days ⟶ 1 year.
How many weeks ?
How many extra days ?

10 Run 1500 metres. How many centimetres ?

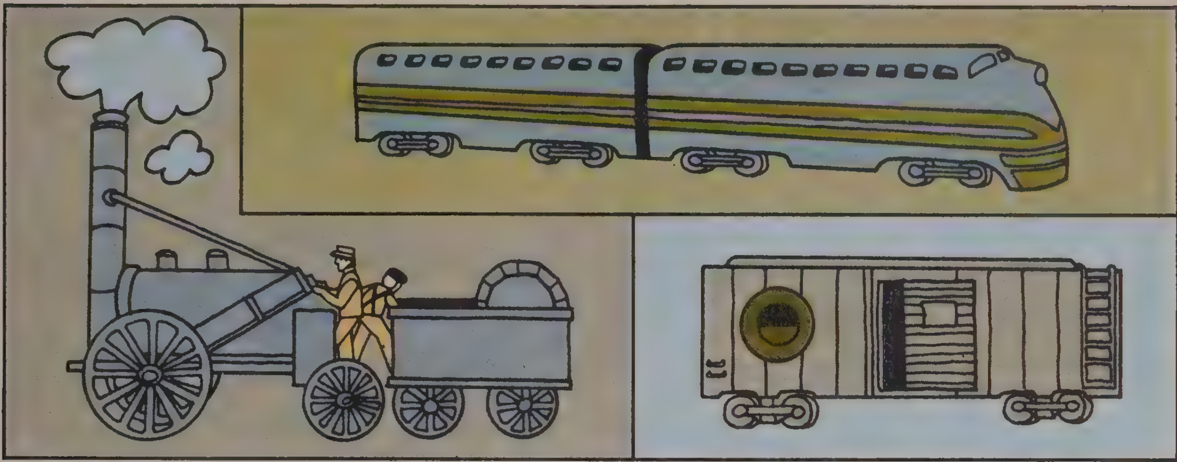
11 52 weeks ⟶ 1 year.
332 weeks.
How many full years ?
How many extra weeks ?

12 60 seconds → 1 minute.
2058 seconds. How many full minutes ? How many extra seconds ?

13 34 children ⟶ 1 classroom.
272 children. How many classrooms ?

★ **14** 780 maples ⟶ 1 square kilometre.
Park: 4680 maples. How many square kilometres ?

Solving Story Problems TRAINS



1. A locomotive similar to the one shown in the picture above was invented in 1829. How many years ago was this?

2. The sleeping section of a modern passenger train is about 147 metres long. If each sleeping car is 21 metres long, how many cars are there?

3. A passenger coach holds 70 people. If 253 people are in passenger coaches on the train, how many full passenger coaches could there be? How many extra people would there be for a partly filled passenger coach?

4. A boxcar is 12 metres long. A train has a boxcar section that is about 276 metres long. How many boxcars are in the section?

5. There are 8 tractors on each flatcar except the last. There are 543 tractors in all.
   A How many full flatcars are there?
   B How many extra tractors are left for the last flatcar?

6. Rails about 12 metres long are put end to end to make one side of a long railroad track. How many rails are needed to make 1 kilometre of one side of a track?

7. The average speed of a fast passenger train is 130 kilometres per hour. How many hours does it take to go 3250 kilometres?

More practice, page A-24, Set 45

Reviewing the Ideas

1. Copy each exercise and find the quotients and remainders. Check your work.

A $3\overline{)60}$	B $4\overline{)72}$	C $5\overline{)68}$
D $6\overline{)258}$	E $7\overline{)430}$	F $8\overline{)664}$
G $9\overline{)2106}$	H $7\overline{)3759}$	I $6\overline{)5239}$
J $32\overline{)224}$	K $68\overline{)476}$	L $91\overline{)549}$
★ M $35\overline{)1505}$	★ N $53\overline{)2491}$	★ O $76\overline{)6764}$

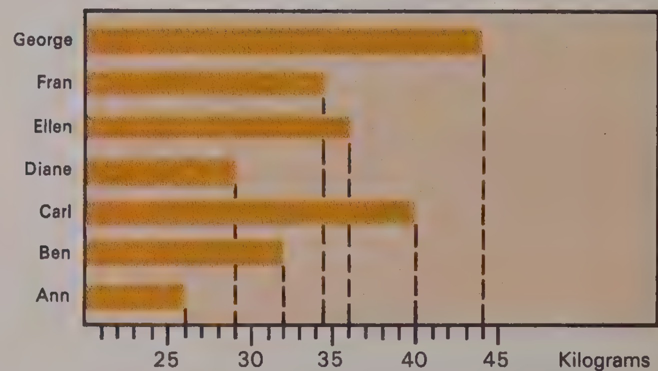
think

I'm smaller than divisors.
We never are the same.
They say it comes out even
When zero is my name.

WHO AM I?

2. A 35 nines can be subtracted from 315. Give the quotient for 315 ÷ 9.
   B Start with 612. Subtract 50 × 9. Then subtract 10 × 9. Finally subtract 8 × 9. Give the quotient for 612 ÷ 9.
   C Start with 5799. Subtract 40 × 87. Subtract 20 × 87. Subtract 6 × 87. Give the quotient for 5799 ÷ 87. Give the remainder.

3. The bar graph shows the weights of 7 fourth-grade children. Give the average weight of these children.



4. The U.S.S. Skate was the first atomic submarine to cross the Atlantic Ocean both ways submerged. The Skate went about 5058 kilometres in 9 days. About how many kilometres was this each day?

Solving Story Problems

ASTRONAUTS AND SPACE FLIGHT

1. The ages, weights, and heights of the first 7 United States astronauts (when they joined the space program) are given in the table. Give these averages:
   - A average age of the first 4 astronauts in the list
   - B average weight of the 5 youngest astronauts
   - C average height in centimetres of the 2 lightest astronauts

Name	Age	Height	Weight
Carpenter	34	176 cm	73
Cooper	32	173 cm	68
Glenn	37	176 cm	82
Grissom	33	168 cm	70
Schirra	36	175 cm	84
Shepard	35	178 cm	73
Slayton	35	176 cm	73

2. A satellite in orbit travels about 28 000 kilometres per hour. How far does it travel in 8 hours ?

3. A satellite in orbit travels about 8 kilometres per second. The airline distance from Vancouver to St. John's is about 7760 kilometres.
   - A About how many seconds would it take the satellite to go over Canada ?
   - B About how many minutes ?

4. In one of the manned satellite flights it took about 88 minutes for the satellite to make one orbit of the earth.
   - A If 1936 minutes had passed since launch time, about how many orbits would have been made ?
   - ★ B If the astronaut slept for 8 hours while in orbit, about how many complete orbits did he make while asleep ?

1. Write the sign (<, >, =) that should go in each ▒.

A $25 + 24$ ▒ $23 + 26$
B 99×7 ▒ 700
C 51×4 ▒ 200
D $840 \div 6$ ▒ $840 \div 7$
E 24×36 ▒ 36×24
F $387 + 49$ ▒ $48 + 388$

2. Pretend that a unit has been chosen and the lengths, widths, and areas of the rectangles are as given. Find the missing numbers.

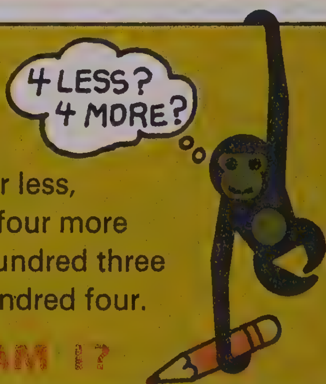
A 13 by 13, area: ▒
B length: 36, width: 43, area: ▒
C length: 22, width: 35, area: ▒
D length: 24, width: 8, area: ▒
E length: ▒, width: 9, area: 567

3. Find the sums.

A	B	C
23	613	8
40	492	407
56	876	8932
35	37	63
49	4023	4006

D $13 + 258 + 87 + 5976 + 503$

think



If I were four less,
Then I'd be four more
Than four hundred three
Plus two hundred four.

WHO AM I?

You are invited to explore

ACTIVITY CARD 12
Page 353

Solving Story Problems

Clock Problems

For exercises 1-4, it is 2:30 in the afternoon.

1. In how many hours will it be
   - A 5:30 in the afternoon?
   - B 7:30 in the evening?
   - C midnight?

2. In how many minutes will it be
   - A 3:30 in the afternoon?
   - B 6:00 in the evening?
   - C 4:47 in the afternoon?
   - D 7:10 in the evening?
   - E 11:20 at night?
   - F 2:30 the next afternoon?

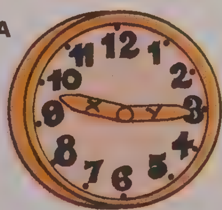
3. Will the minute hand overtake the hour hand
   - A in the next 30 minutes?
   - B in the next 40 minutes?
   - C in the next 45 minutes?
   - D in the next 50 minutes?

4. How many times will the minute hand pass the hour hand in the next
   - A 2 hours?
   - B 3 hours?
   - C 4 hours?
   - D 12 hours?

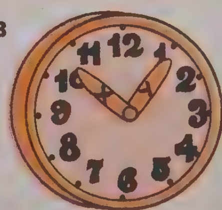
5. It is 5:37 in the afternoon.
   - A How many minutes has it been since 2:45 in the afternoon?
   - B How many minutes will it be before a television program at 7:45 in the evening?
   - C How long has it been since breakfast at 7:30 in the morning?

★ 6. If the hands of a clock point in the directions shown, which hand is the minute hand? Answer **x** or **y**.

A



B



11

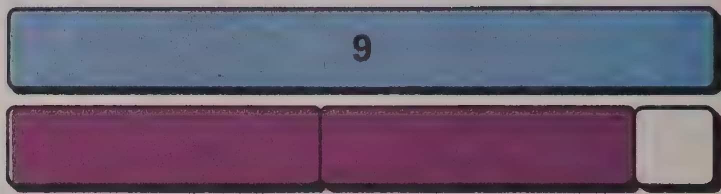
Number theory

How are even and odd numbers different?

Investigating the Ideas

The 8-strip matches two strips that are the same length.

The 9-strip will not match two strips that are the same length.



? What other strips can be matched with two strips that are the same length?

Discussing the Ideas

- A number that is
  2 × (a whole number)
  is called an **EVEN NUMBER.**

- A number that is
  1 + (an even number)
  is called an **ODD NUMBER.**

1. If you had strips for numbers up to 30, which strips would be like the 8-strip? like the 9-strip? From the definition above, which numbers are odd? even?

2. Study this sequence of **even numbers.**

$$0, 2, 4, 6, 8, \underbrace{10, 12, 14, 16, 18}_{\text{tens}}, \underbrace{20, 22, 24, 26, 28}_{\text{twenties}}, \ldots$$

What is true about the last digit of an **even number**?

3. What is true about the last digit of an **odd number**?

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

×	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	12	16	20	24	28	32	36
5	0	5	10	15	20	25	30	35	40	45
6	0	6	12	18	24	30	36	42	48	54
7	0	7	14	21	28	35	42	49	56	63
8	0	8	16	24	32	40	48	56	64	72
9	0	9	18	27	36	45	54	63	72	81

1. A How many sums are there in the blue addition table?
B How many of the sums are **even numbers**?
C How many of the sums are **odd numbers**?

2. A How many products are there in the yellow multiplication table?
B How many of the products are **even numbers**?
C How many of the products are **odd numbers**?

3. A In the multiplication table, the 2 row contains only even numbers. Give the other rows that contain only even numbers.
B Are there any rows that contain only odd numbers?
C Give a row that helps show that an even number times any number gives a product that is an even number.
D Does an odd number times any number give a product that is an odd number?

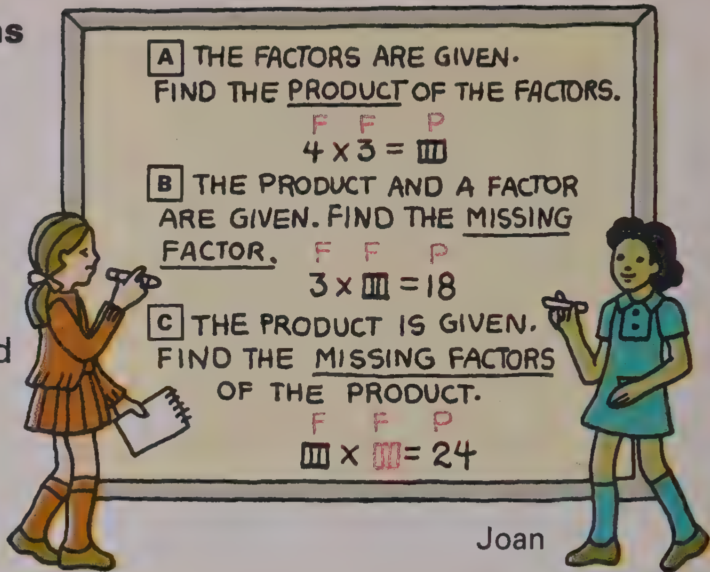
★ **4.** Write **O** (odd) or **E** (even) for each space in the tables at the right.

+	E	O
E (even)	A	B
O (odd)	C	D

×	E	O
E	E	F
O	G	H

Investigating the Ideas

Joan gave Sara these problems to solve. Sara solved problems A and B easily. When she tried problem C, she stopped and looked very puzzled. Do you know why?



? Can you give all the possible answers to problem C?

Discussing the Ideas

1. Study the equations in A and B and then give the numbers for each ▥.

A Since $n \times 7 = 28$ has the solution 4, we know that 4 and 7 are factors of ▥.

B Since $n \times 6 = 28$ has no whole-number solution, we know that ▥ **is not** a factor of 28.

2. A How do you know that 9 is a factor of 36?
   B How do you know that 8 is not a factor of 36?

3. A How many different multiplication equations that have 18 as the product can you find?
   B Can you list all the factors of 18?

1. Write as many different multiplication equations that have these numbers as **products** as you can. Write equations using just two factors at a time.

A 6 (Example: $1 \times 6 = 6$, $2 \times 3 = 6$) B 18 C 20 D 28

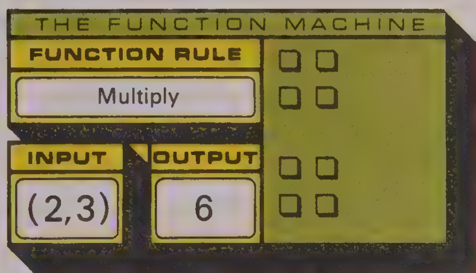
E 32 F 30 G 36 H 48 I 100

2. Solve the equation and give two factors of the product.

A $n \times 5 = 15$ (Answer: 3, 5)
B $n \times 7 = 63$
C $n \times 5 = 60$
D $n \times 12 = 48$
E $n \times 15 = 75$
F $n \times 13 = 39$
G $n \times 9 = 72$
H $n \times 18 = 72$
I $n \times 36 = 72$
J $n \times 1 = 32$
K $n \times 2 = 32$
L $n \times 4 = 32$
M $n \times 16 = 48$
N $n \times 2 = 48$

3. A Is 4 a factor of 11 ?
B Is 8 a factor of 63 ?
C Is 13 a factor of 42 ?
D Is 17 a factor of 51 ?

4. Using the rule shown, you can put a **pair** of numbers into the function machine and get a single output number. Some output numbers are given below. Give as many pairs as you can that would produce each output number.



Example: 4 Answers: (1, 4) and (2, 2)

A 12 C 5 E 18 G 30 I 50 K 15
B 6 D 8 F 11 H 36 J 13 L 21

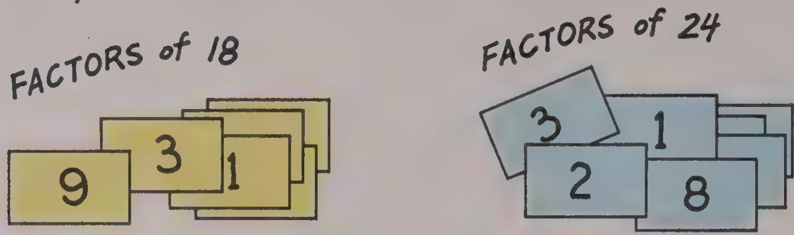
5. List all the factors of each number.
Example: 12 (Answers: 1, 2, 3, 4, 6, 12)

A 6 C 8 E 11 G 36 I 45
B 5 D 18 F 30 H 50 J 1

How do you find the greatest common factor?

Investigating the Ideas

Suppose you had sets of cards like these.



? What is the largest number that is on both a yellow and a blue card?

Discussing the Ideas

1. The numbers that are factors of **both 18 and 24** are called common factors of 18 and 24. Which numbers are common factors of 18 and 24?

2. The **largest number** that is a factor of both 18 and 24 is called the greatest common factor of 18 and 24. What number is the greatest common factor of 18 and 24?

3. A Can you give the numbers missing from the diagram?

The factors of 8 : { 1, 2, 4, 8 }

The factors of 12 : { 1, 2, 3, 4, 6, 12 }

____, ____, and ____ are common factors of 8 and 12.

____ is the greatest common factor of 8 and 12.

B On the chalkboard, show a diagram like this for the factors of 6 and 9.

1. A List the factors of 9. B List the factors of 12.
   C List the common factors of 9 and 12.
   D What is the greatest common factor of 9 and 12?

2. A List the factors of 6. B List the factors of 8.
   C List the common factors of 6 and 8.
   D What is the greatest common factor of 6 and 8?

3. A List the factors of 12. B List the factors of 16.
   C List the common factors of 12 and 16.
   D What is the greatest common factor of 12 and 16?

4. A List the factors of 8. B List the factors of 9.
   C List the common factors of 8 and 9.
   D What is the greatest common factor of 8 and 9?

5. A List the factors of 12. B List the factors of 18.
   C List the common factors of 12 and 18.
   D What is the greatest common factor of 12 and 18?

6. A List the factors of 24. B List the factors of 32.
   C List the common factors of 24 and 32.
   D What is the greatest common factor of 24 and 32?

★ 7. Give an odd number and an even number between 10 and 20 that have 3 as the greatest common factor.

think FACTORS

When you're looking for the factors,
You'll find I'm rather fun.
I'm the very smallest factor
Of almost every one!

WHO AM I?

More practice, page A-25, Set 46

Investigating the Ideas

Here is a multiplication table with the zero row and column and the 1 row and column left out.

×	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48		
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60			
5	10	15	20	25	30	35	40	45	50	55	60	65	70				
6	12	18	24	30	36	42	48	54	60	66	72	78					
7	14	21	28	35	42	49	56	63	70	77	84						
8	16	24	32	40	48	56	64	72	80	88							
9	18	27	36	45	54	63	72	81	90								
10	20	30	40	50	60	70	80	90									
11	22	33	44	55	66	77	88										
12	24	36	48	60	72	84											
13	26	39	52	65	78												
14	28	42	56	70													
15	30	45	60														
16	32	48															
17	34																
18																	

Think of this table as going on without end.

? Can you list ten numbers between 1 and 34 that **do not** appear in the blue part of the table?

Discussing the Ideas

1. 7 is not one of the products in the table. Can you explain why?
2. 13 is not one of the products. Why?
3. 29 is not one of the products. Why?
4. Name some other numbers that are not among the products.
5. Write all the whole numbers from 2 to 34.

   2, 3, 4, 5, 6, . . . 32, 33, 34.

   Now mark out the numbers that are products in the table above. What you have left is the set of all prime numbers less than 34.

1. Complete each sentence with an equation.
   I know that 20 is **not prime** because $4 \times 5 = 20$.
   - A I know that 12 is **not prime** because ____ × ____ = 12.
   - B I know that 14 is **not prime** because ____ × ____ = 14.
   - C I know that 24 is **not prime** because ____ × ____ = 24.

2. Tell whether each number is prime or not prime.
   A 15 B 17 C 19 D 21 E 23

3. Copy each equation. Give the missing numbers.
   A ____ × ____ = 2 B ____ × ____ = 3 C ____ × ____ = 5

4. Could you find a different pair of factors for any part of exercise 3?

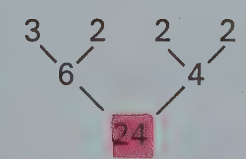
5. A 2 is a prime number. What are the factors of 2?
   - B 3 is a prime number. What are the factors of 3?
   - C 5 is a prime number. What are the factors of 5?
   - D How many different factors does a prime number have?

6. List all the factors of each of the following numbers.
   A 7 B 1 C 13 D 17 E 19

★ 7. List all prime numbers less than 50.

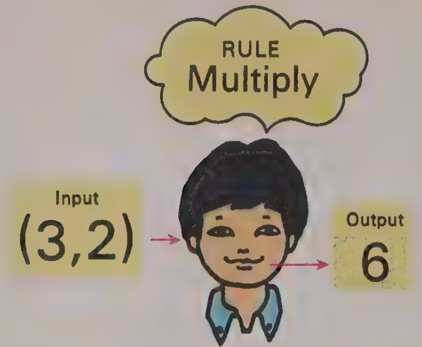
★ 8. Give the correct number or word.
   - A The number ____ is a factor of every number.
   - B Each prime number has exactly ____ factors.
   - C The factors of a prime number are the number itself and ____.
   - D The number ____ has exactly one factor.
   - E If a number has more than two factors, it is not a __?__ number.

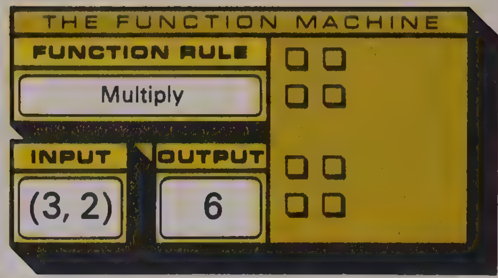
think



This is a "tree" for 24. Can you make a "tree" for 36?

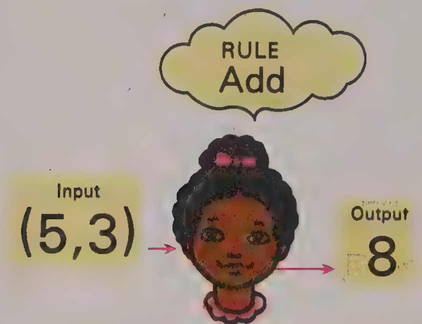
The Function Machine

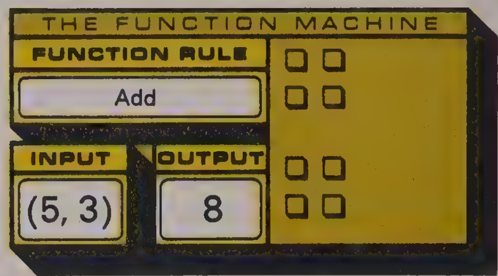




1. Give a pair of **prime numbers** that will produce each of these output numbers. A 4 [Answer: (2, 2)]

B 10 C 9 D 14 E 15 F 21 G 22 H 25 I 26 J 33

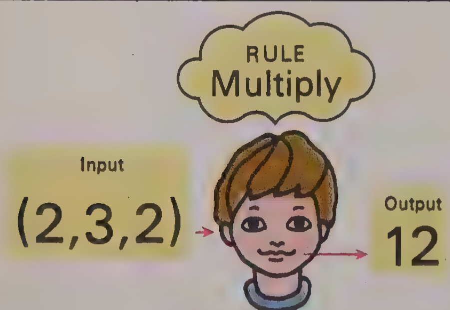


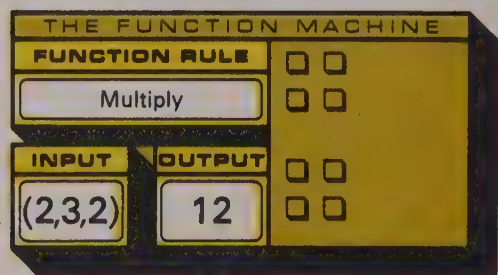


2. Give a pair of **prime numbers** that will produce each output number. A 9 [Answer: (7, 2)]

B 4 C 12 D 6 E 14 F 10 G 15 H 16 I 18 J 20

K 21 L 22 M 24 N 25 O 26 P 28 Q 30 R 32 S 33





3. Give the output number for each number triple.

A (1, 4, 2) B (2, 4, 2) C (5, 3, 0) D (1, 1, 1) E (3, 4, 5)

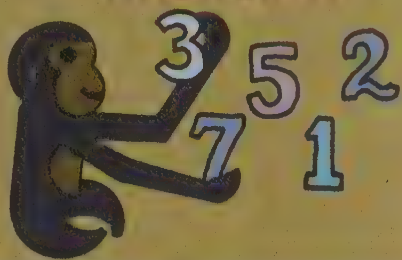
Prime Number Problems

1. The whole numbers greater than 1 that are not prime numbers are called **composite** numbers.

- A List the composite numbers less than 40.
- B Give a composite number between 90 and 100.

2.
- A List all the factors of 12.
- B List the factors of 12 which are prime.
- C List the factors of 30.
- D List the prime factors of 30.

> *think*
>
> I'm such a sad odd number.
> I cannot be a prime.
> Since I have just one factor,
> They leave me out each time.
>
> WHO AM I?



3. The equation $30 = 5 \times 2 \times 3$ shows that 30 is a product of prime numbers. Write equations to show that 35 and 36 are products of prime numbers.

4. Give the word or number for each blank.

- A Every prime number is odd except __?__.
- B The number __?__ is a factor of every number.
- C Each prime number has exactly __?__ factors.
- D The only factor of 1 is __?__.
- E Since the only factors of 73 are 1 and 73, 73 is a __?__ number.
- F Since 69 has four factors, 69 is a __?__ number.
- G 57 is not a prime number because $3 \times n = 57$.
- H __?__ is the only prime number between 61 and 71.
- ★ I __?__ is the only prime number between 79 and 89.
- ★ J __?__ is the only prime number between 103 and 109.
- ★ K __?__ is the only prime number between 113 and 131.

★ **5.** The numbers 3 and 5 are called **twin primes** because their difference is 2. Another pair of twin primes is 41 and 43. Give four more pairs of twin primes.

More practice, page A-25, Set 47

Reviewing the Ideas

1. Answer **E** if the number is even and **O** if it is odd.
   A 68   C 2001   E 7642
   B 83   D 3958   F 7050

2. The first even number is 0. The second is 2. The third is 4. The fourth is 6. The fifth is 8.
   A What is the sixth even number?
   B What is the ninth even number?
   C What is the seventeenth even number?

> *think*
>
> I'm slightly less than 30,
> But more than 22.
> They say that I am perfect,
> And here is why they do.
> Just add up all my factors,
> And then divide by two.
> You'll find that I'm the answer.
> I'll say no more to you.
>
> WHO AM I?

3. The first odd number is 1. The second is 3.
   A What is the third odd number?
   B What is the eighth odd number?
   C What is the fourteenth odd number?

4. List the composite numbers between 20 and 30.

5. A List the factors of 18.   B List the factors of 24.
   C List the common factors of 18 and 24.
   D What is the greatest common factor of 18 and 24?

6. A List the factors of 30.   B List the factors of 42.
   C List the common factors of 30 and 42.
   D List the common **prime** factors of 30 and 42.
   E What is the greatest common factor of 30 and 42?

7. A Write an equation to show that 38 is the product of two prime numbers.
   B Write an equation to show that 39 is the product of two prime numbers.

Keeping in Touch with Addition, Subtraction, Multiplication, Division

1. Solve the equations.

A $10 \times 10 = n$	D $100 \times 100 = n$	G $10\,000 \div 10 = n$
B $100 \times 10 = n$	E $100 \div 10 = n$	H $10\,000 \div 100 = n$
C $10 \times 1000 = n$	F $1000 \div 10 = n$	I $10\,000 \div 1000 = n$

2. Give the missing numbers.

A Since $5 \times 7 = 35$, we call |||| a multiple of 7.
B 48 is a multiple of 6 because $n \times 6 = 48$.
C Since $5 \times 9 = 45$, 45 is a multiple of both 5 and ||||.
D Since $63 + 78 = 141$, we know that $141 - 78 = n$.
E Since $156 - 79 = 77$, we know that $77 + 79 = n$.
F Since $7 \times 38 = 266$, we know that $266 \div 7 = n$.
G Since $147 \div 3 = 49$, we know that $49 \times 3 = n$.
H Since $39 + 39 = 78$, we know that $78 - (39 + 39) = n$.

3. Find the sums and differences.

A $\begin{array}{r} 35 \\ +89 \\ \hline \end{array}$ B $\begin{array}{r} 132 \\ -59 \\ \hline \end{array}$ C $\begin{array}{r} 5076 \\ +3938 \\ \hline \end{array}$ D $\begin{array}{r} 8206 \\ -39 \\ \hline \end{array}$ E $\begin{array}{r} 30\,042 \\ -5\,978 \\ \hline \end{array}$

4. Find the products.

A $\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$ B $\begin{array}{r} 38 \\ \times 7 \\ \hline \end{array}$ C $\begin{array}{r} 434 \\ \times 9 \\ \hline \end{array}$

D $\begin{array}{r} 32 \\ \times 25 \\ \hline \end{array}$ E $\begin{array}{r} 627 \\ \times 34 \\ \hline \end{array}$ F $\begin{array}{r} 347 \\ \times 562 \\ \hline \end{array}$

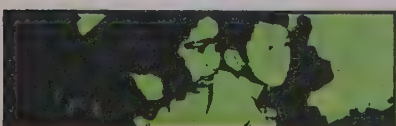
5. Find the quotients.

A $7\overline{)294}$ B $8\overline{)3448}$ C $23\overline{)2093}$

think

Multiply me by myself,
Or find my sum with two.
Your answer is the same
No matter which you do.

WHO AM I?



You are invited to explore

ACTIVITY CARD 13
Page 353

12 Fractions

Let's explore number pairs and fractions.

Investigating the Ideas

$\boxed{A}$

2 parts out of 4 are covered.

$\frac{2}{4}$ ("two fourths") of

the purple strip is covered.

$\boxed{B}$

3 parts out of 5 are covered.

$\frac{3}{5}$ ("three fifths") of

the yellow strip is covered.

"$\frac{2}{4}$" and "$\frac{3}{5}$" are called **fractions.**

? Can you show "cover-ups" like these with other strips and write the fractions?

Discussing the Ideas

1. A What **pair of numbers** do we think about in $\boxed{A}$? in $\boxed{B}$?
   B We wrote the **fraction** $\frac{2}{4}$ in $\boxed{A}$. What fraction did we write in $\boxed{B}$?

2. A What number pair do you think about in this picture?
   B What fraction of the light green strip is covered?

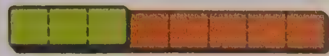
3. A What number pair do you think about in this picture?
   B What fraction of the light green strip is covered?

1. Give the **number pair** and the **fraction** for each picture.

A

? out of ? is covered.
? of the yellow strip is covered.

B



? out of ? are covered.
? of the brown strip is covered.

C

? out of ? is covered.
? of the red strip is covered.

D

? out of ? are covered.
? of the orange strip is covered.

E

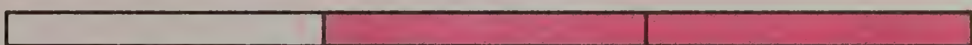
? out of ? are covered.
? of the purple strip is covered.

F

? out of ? are covered.
? of the brown strip is covered.

2. What fraction of each long strip has been shaded red ?

A 

B 

C 

D 

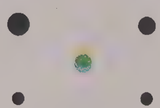
E 

F 

★ **G** 

Discussing the Ideas

1.

We see	We think	We write	We say
	3 red parts 4 parts in all	$\frac{3}{4}$ of the region is red.	three fourths of the region is red.
	2 parts covered 3 parts in all	____ of the light green strip covered.	____ of the light green strip is covered.
	4 blue parts 6 parts in all	____ of the region is blue.	____ of the region is blue.
	1 green dot 5 dots in all	____ of the dots are green.	____ of the dots are green.

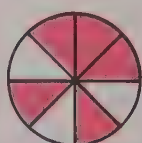
In this column, we think about a number pair.

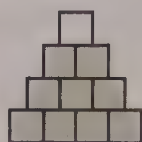
In this column, we write a fraction for the number pair.

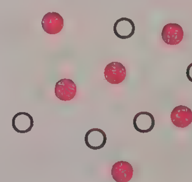
Can you write and read the fraction for each part?

2. Write and read a fraction for the shaded part of each figure.

A 

B 

C 

D 

3. What fraction is suggested by each of these?

A 2 out of 5

B 7 out of 10

C 1 out of 2

D 2 out of 3

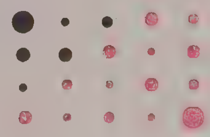
E 12 out of a hundred

F 9 times out of 10

Give the missing numbers. Then give a fraction to answer each question.

1. 

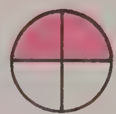
A ||||| parts are red.
B ||||| parts in all.
C What part of the region is red?

2. 

A ||||| dots are black.
B ||||| dots in all.
C What part of the dots are black?

3. 

A ||||| triangles are red.
B ||||| triangles in all.
C What part of the triangles are red?

4. 

A ||||| sections are red.
B ||||| sections in all.
C What part of the region is red?

5. Write a fraction for this number-pair story.
Tom said, "5 of the 8 birds in our yard are cardinals." What fraction of the birds are cardinals?

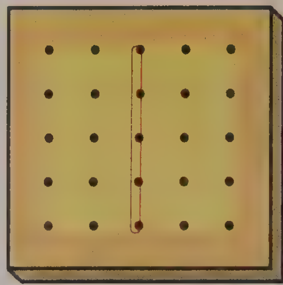
6. Write a number-pair story about each fraction.

A $\frac{1}{4}$ B $\frac{2}{3}$ C $\frac{5}{6}$ D $\frac{1}{2}$ E $\frac{7}{8}$ F $\frac{3}{4}$

Let's explore fractions and parts of an object.

Investigating the Ideas

Use a nailboard and rubber bands or dot paper and lines.



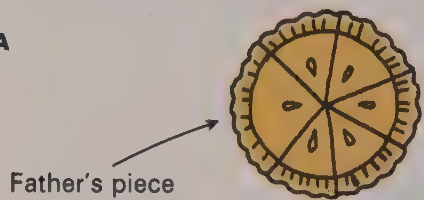
? How many different ways can you find to use one straight rubber band (line) and divide the yellow part into halves?

Discussing the Ideas

1. How can you tell when you have divided the yellow part into halves?

2. Answer the questions and explain your answers.

A

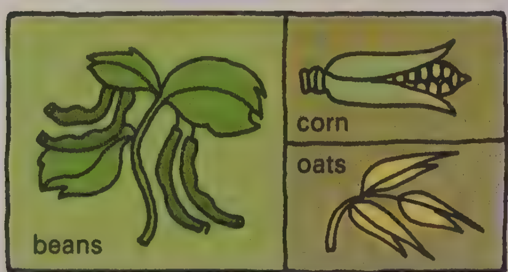


Is Father's piece $\frac{1}{6}$ of the pie?

B

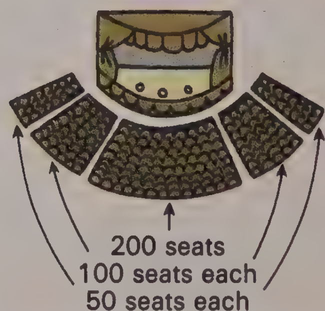
Is Alan's piece $\frac{1}{2}$ of the candy bar?

C



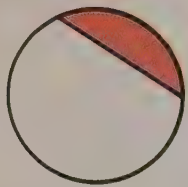
Did Mr. White plant $\frac{1}{3}$ of his field with oats?

D

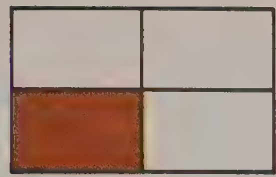


Does the centre section have $\frac{1}{5}$ of the seats?

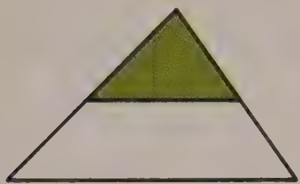
Answer **true** or **false** for each exercise.

1. 

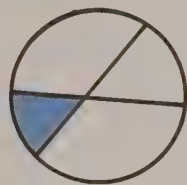
$\frac{1}{2}$ of the region is red.

2. 

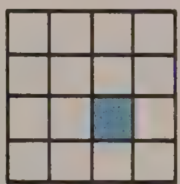
$\frac{1}{4}$ of the region is brown.

3. 

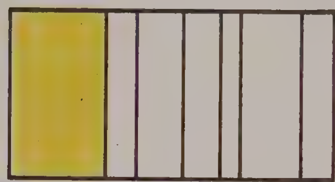
$\frac{1}{2}$ of the region is green.

4. 

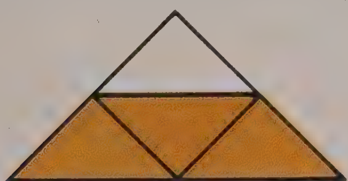
$\frac{1}{4}$ of the region is blue.

5. 

$\frac{1}{16}$ of the region is blue.

6. 

$\frac{1}{7}$ of the region is yellow.

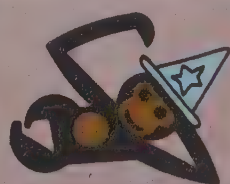
7. 

$\frac{3}{4}$ of the region is orange.

8. 

$\frac{3}{4}$ of the region is red.

think

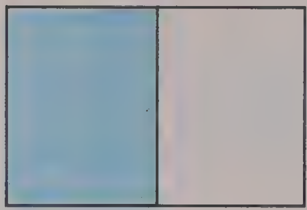


There is a trick to this one.
See if you can figure it out.
Terry said, "I have two coins
in my hand. Together they
total 30¢. One of them is not
a nickel. What coins do I have?"

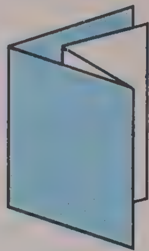
More practice, page A-26, Set 48

Can two fractions show the same amount?

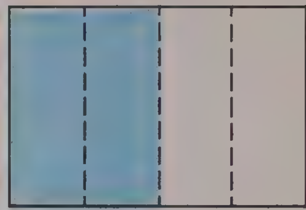
Investigating the Ideas



$\frac{1}{2}$ of the paper is colored.



Fold the paper twice.



$\frac{2}{4}$ of the paper is colored.

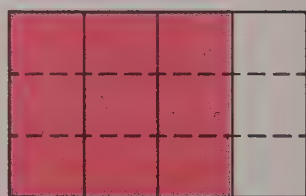
? Can you fold and color a piece of paper to show $\frac{4}{8}$ of it colored?

Discussing the Ideas

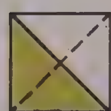
1. What part of the dark green strip is covered by the red strip? Can you give more than one fraction to show the part that is covered?

2. A Explain what you are thinking if you say, "$\frac{9}{12}$ of the region is red."

   B Explain what you are thinking if you say, "$\frac{3}{4}$ of the region is red."

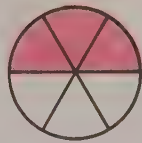


3. Explain two different ways you might think about the part of the small square region that is shaded.

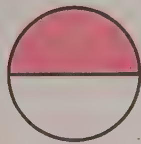


1. First give the missing number. Then give the fraction for the number pair.

A 3 of the ▯ parts are red.
▯ of the region is red.



B 1 of the ▯ parts is red.
▯ of the region is red.

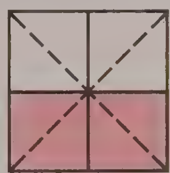


C 4 of the ▯ parts are red.
▯ of the region is red.

2. Give at least two fractions to tell what part of each region is shaded.

A

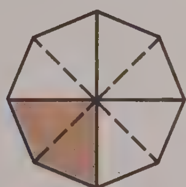
B



C

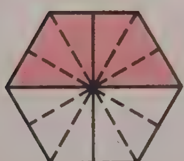
D

E

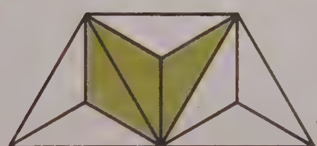


F

G

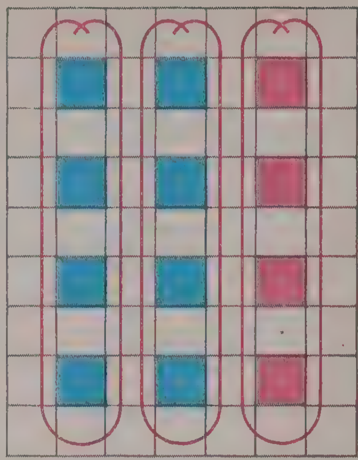


★ H



★ I

Investigating the Ideas

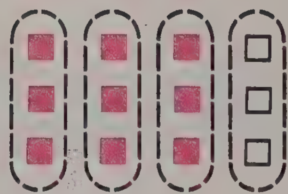


2 sets out of 3 sets are blue.
$\frac{2}{3}$ of the squares are blue.

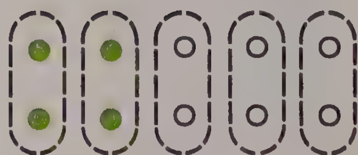
On your graph paper, color 12 squares like this, with 8 of them blue.

? Can you circle sets of squares to show that $\frac{4}{6}$ of the squares are blue?

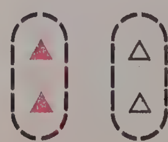
Discussing the Ideas



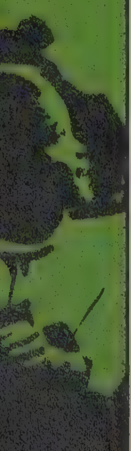
1. A Explain what you are thinking if you say, "$\frac{9}{12}$ of the squares are red."
   B Explain what you are thinking if you say, "$\frac{3}{4}$ of the squares are red."



2. A Explain what you are thinking if you say, "$\frac{4}{10}$ of the circles are green."
   B Explain what you are thinking if you say, "$\frac{2}{5}$ of the circles are green."



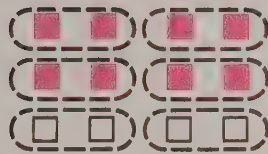
3. Explain two different ways you might think about what part of the set of triangles is red.



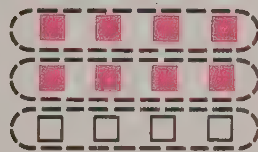
1. First give the missing number. Then give the fraction for the number pair.

A 8 of the ▥ squares are red.
▥ of the squares are red.

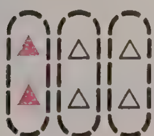
B ▥ of the 6 sets have red squares.
▥ of the squares are red.



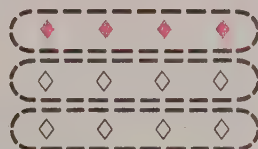
C ▥ of the 3 sets have red squares.
▥ of the squares are red.

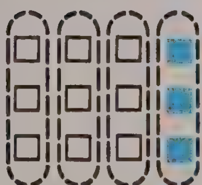


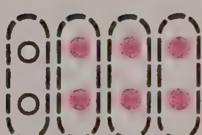
2. For each set, give at least two different fractions to tell what part of the set is colored.

A 

B 

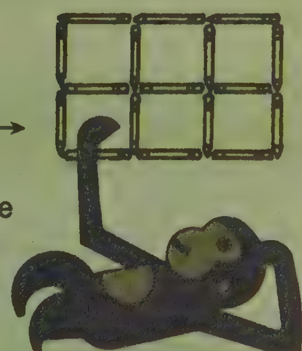
C 

D 

E 

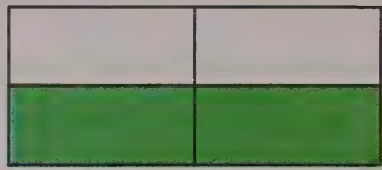
think

Arrange 17 pencils (or sticks) like this. →
Now remove just 5 of the pencils so you have 3 squares.



Discussing the Ideas

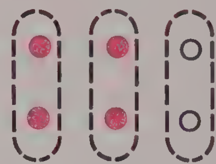
1. A Explain what you are thinking if you say, "$\frac{1}{2}$ of the region is shaded."
   B Explain what you are thinking if you say, "$\frac{2}{4}$ of the region is shaded."



Such pairs of fractions are called equivalent fractions.

$\frac{1}{2}$ is equivalent to $\frac{2}{4}$.

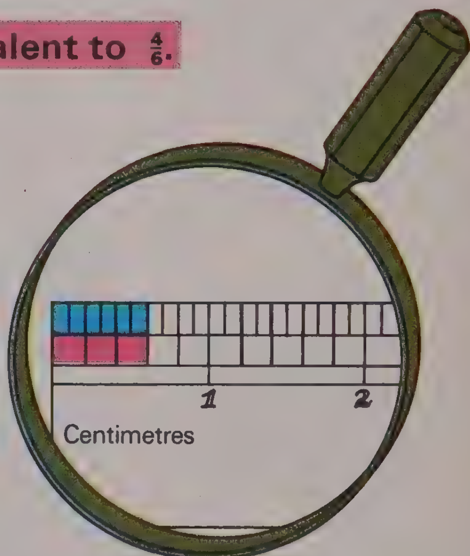
2. A Explain what you are thinking if you say "$\frac{2}{3}$ of the dots are red."
   B Explain what you are thinking if you say "$\frac{4}{6}$ of the dots are red."



Such pairs of fractions are called equivalent fractions.

$\frac{2}{3}$ is equivalent to $\frac{4}{6}$.

3. A Explain what you are thinking if you say, "$\frac{3}{5}$ of the way to the 1-cm mark is shaded red."
   B Explain what you are thinking if you say, "$\frac{6}{10}$ of the way to the 1-cm mark is shaded blue."

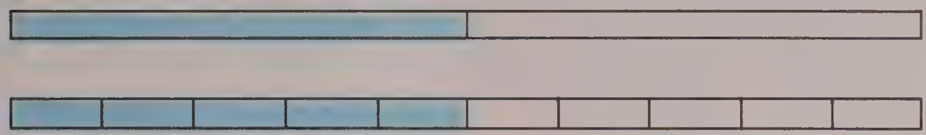


Such pairs of fractions are called equivalent fractions.

$\frac{3}{5}$ is equivalent to $\frac{6}{10}$.

1. Complete the fraction suggested by the shading of each bar. Then copy the sentence and complete the fractions.

A

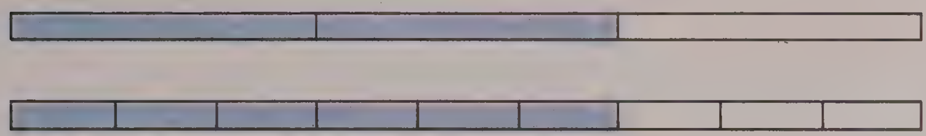


$\frac{\blacksquare}{2}$

$\frac{\blacksquare}{10}$

$\frac{\blacksquare}{2}$ is equivalent to $\frac{\blacksquare}{10}$.

B

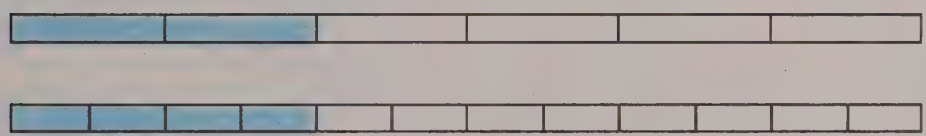


$\frac{\blacksquare}{3}$

$\frac{\blacksquare}{9}$

$\frac{\blacksquare}{3}$ is equivalent to $\frac{\blacksquare}{9}$.

C

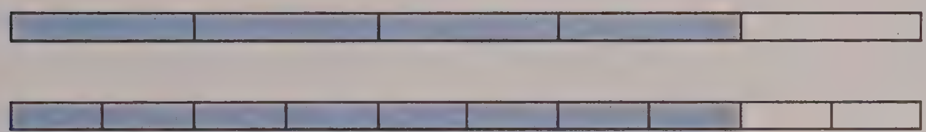


$\frac{\blacksquare}{6}$

$\frac{\blacksquare}{12}$

$\frac{\blacksquare}{6}$ is equivalent to $\frac{\blacksquare}{12}$.

D



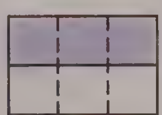
$\frac{\blacksquare}{5}$

$\frac{\blacksquare}{10}$

$\frac{\blacksquare}{5}$ is equivalent to $\frac{\blacksquare}{10}$.

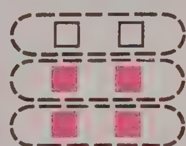
2. Write the pair of equivalent fractions suggested by each picture.

A

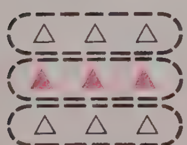


B

C

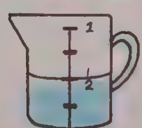


D

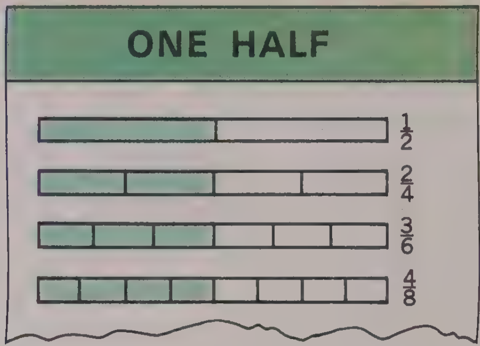


E

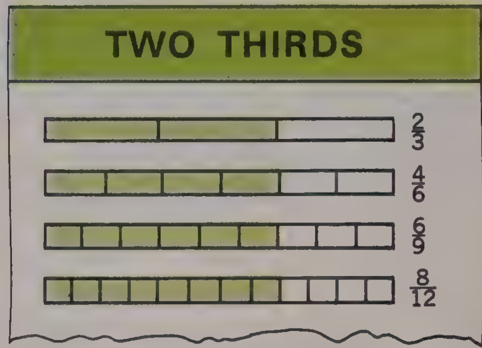
F



Investigating the Ideas

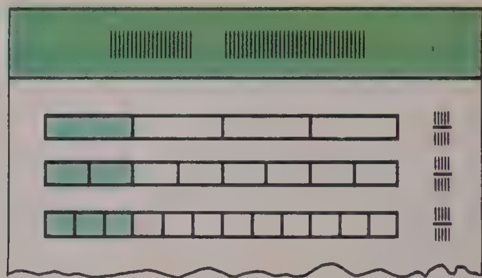


This chart shows some fractions that are equivalent to $\frac{1}{2}$: $\{\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \ldots\}$.



This chart shows some fractions that are equivalent to $\frac{2}{3}$: $\{\frac{2}{3}, \frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \ldots\}$.

? Can you find the missing fractions for this chart and give some more fractions for the set?



This chart shows some fractions that are equivalent to [illegible]: {[illegible], [illegible], [illegible], . . .}.

Discussing the Ideas

1. Can you describe what the next bar in the "One Half" chart would look like?

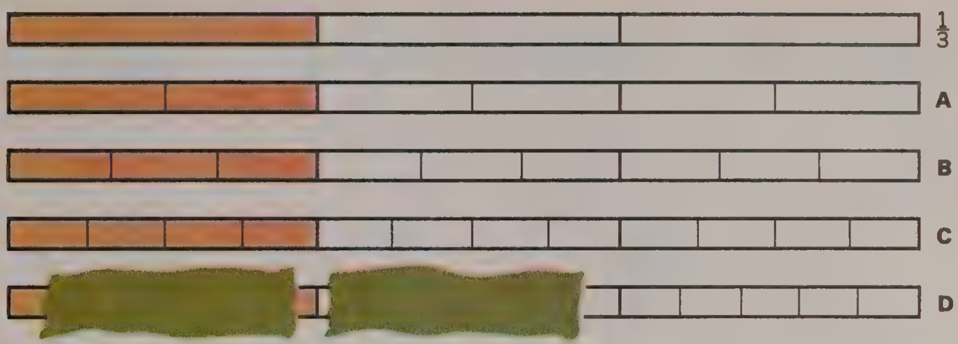
2. What would the next bar in the "Two Thirds" chart be like?

3. Is the same amount of the bar shaded for $\frac{2}{4}$ as for $\frac{4}{8}$?

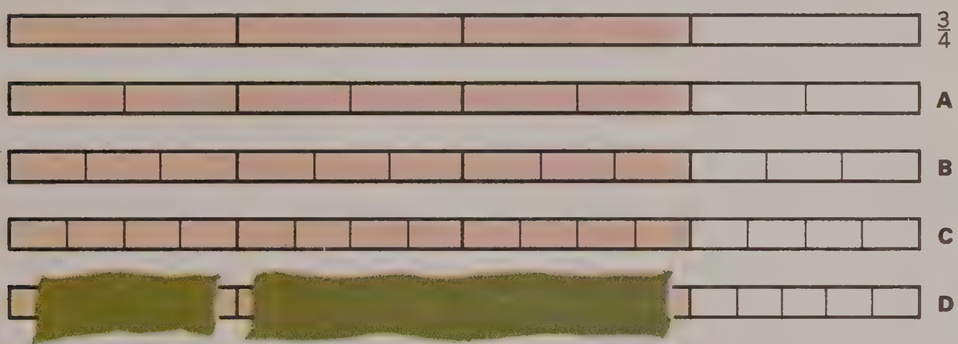
4. What name would you give to the last chart?

Using the Ideas

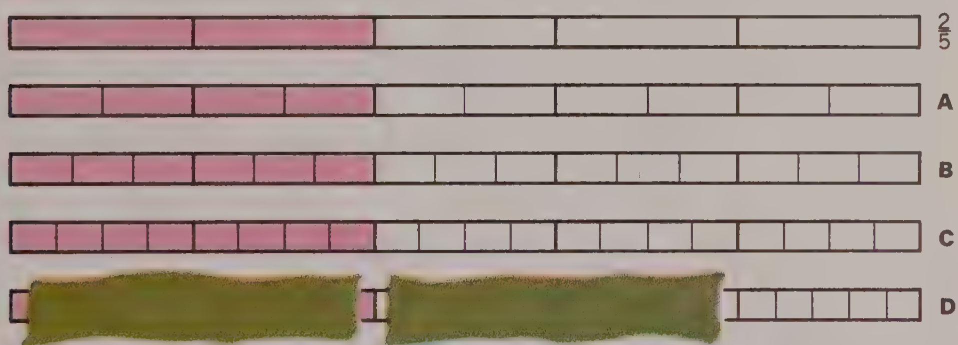
1. Study the bars and give the missing fractions.



2. Study the bars and give the missing fractions.



3. Study the bars and give the missing fractions.



★ **4.** Give the next three fractions for each set of equivalent fractions.

A $\{\frac{1}{4}, \frac{2}{8}, \frac{3}{12}, \frac{4}{16}, \ldots\}$

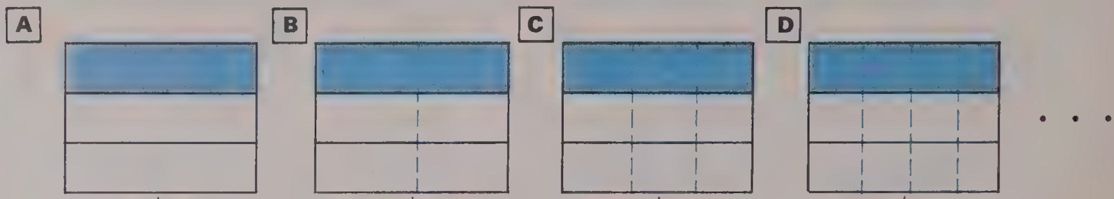
B $\{\frac{3}{5}, \frac{6}{10}, \frac{9}{15}, \frac{12}{20}, \ldots\}$

C $\{\frac{1}{8}, \frac{2}{16}, \frac{3}{24}, \ldots\}$

D $\{\frac{7}{10}, \frac{14}{20}, \frac{21}{30}, \ldots\}$

More practice, page A-26, Set 49

Investigating the Ideas



$$\frac{1}{3} \qquad \frac{2\times 1}{2\times 3} \qquad \frac{3\times 1}{3\times 3} \qquad \frac{4\times 1}{4\times 3} \qquad \cdots$$

$$\left\{\frac{1}{3},\ \frac{2}{6},\ \frac{3}{9},\ \frac{4}{12},\ \ldots\right\}$$

A set of **equivalent fractions**

? Can you cut out and color four papers, like this, and fold them to show a set of equivalent fractions?

Discussing the Ideas

1. A How many parts are shaded in $\boxed{A}$? How many parts in all?
   B How many parts are shaded in $\boxed{B}$? How many parts in all?
   C How many times as many parts are shaded in $\boxed{C}$ as in $\boxed{A}$?

2. How would you find the next three fractions in the set above?

3. How would you continue this set?

$$\left\{\frac{1\times 3}{1\times 4},\ \frac{2\times 3}{2\times 4},\ \frac{3\times 3}{3\times 4},\ \frac{4\times 3}{4\times 4},\ \boxed{A},\ \boxed{B},\ \boxed{C},\ \boxed{D},\ \ldots\right\}$$

4. Give the set of fractions for exercise 3.

1. Find the missing fractions.

$\frac{1 \times 1}{1 \times 6}$,	$\frac{2 \times 1}{2 \times 6}$,	$\frac{3 \times 1}{3 \times 6}$,	$\frac{4 \times 1}{4 \times 6}$,	.	.
↓	↓	↓	↓	↓	↓
$\frac{1}{6}$	$\frac{2}{12}$	A	B	C	D
$\frac{1 \times 3}{1 \times 8}$,	$\frac{2 \times 3}{2 \times 8}$,	$\frac{3 \times 3}{3 \times 8}$,	$\frac{4 \times 3}{4 \times 8}$,	.	.
↓	↓	↓	↓	↓	↓
$\frac{3}{8}$	$\frac{6}{16}$	E	F	G	H
$\frac{1 \times 4}{1 \times 5}$,	$\frac{2 \times 4}{2 \times 5}$,	$\frac{3 \times 4}{3 \times 5}$,	$\frac{4 \times 4}{4 \times 5}$,	.	.
↓	↓	↓	↓	↓	↓
$\frac{4}{5}$	$\frac{8}{10}$	I	J	K	L
$\frac{1 \times 1}{1 \times 4}$,	$\frac{2 \times 1}{2 \times 4}$,	$\frac{3 \times 1}{3 \times 4}$,	.	.	.
↓	↓	↓	↓	↓	↓
$\frac{1}{4}$	M	N	O	P	Q

2. Find the next three fractions for each set of equivalent fractions.

A $\left\{\frac{1}{3}, \frac{2}{6}, \frac{3}{9}, \frac{4}{12}, \ldots\right\}$

B $\left\{\frac{1}{8}, \frac{2}{16}, \frac{3}{24}, \frac{4}{32}, \ldots\right\}$

C $\left\{\frac{5}{6}, \frac{10}{12}, \frac{15}{18}, \ldots\right\}$

D $\left\{\frac{2}{7}, \frac{4}{14}, \frac{6}{21}, \ldots\right\}$

think

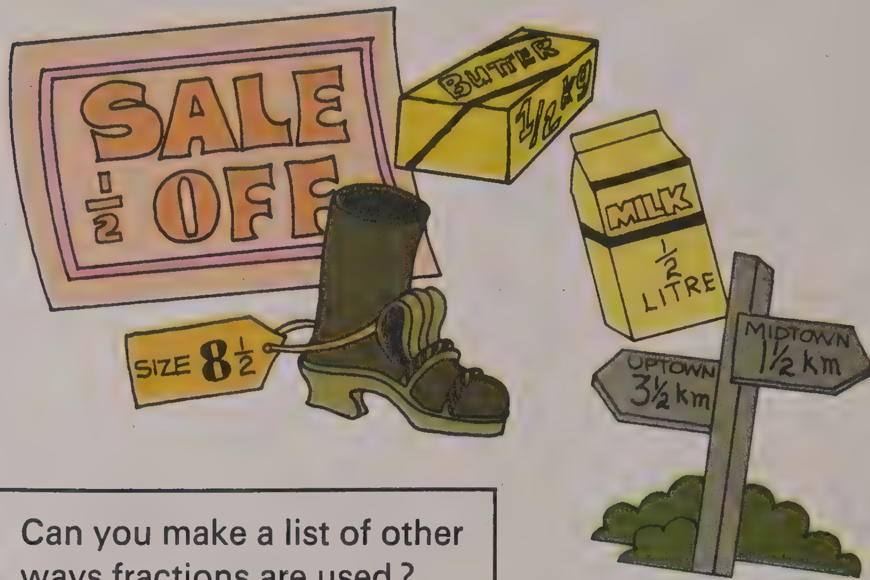
Find the missing numbers. $\left\{\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \ldots, \frac{A}{50}, \ldots, \frac{B}{100}\right\}$

$\left\{\frac{1}{3}, \frac{2}{6}, \frac{3}{9}, \frac{4}{12}, \ldots, \frac{C}{90}, \ldots, \frac{D}{300}\right\}$ $\left\{\frac{3}{4}, \frac{6}{8}, \frac{9}{12}, \ldots, \frac{E}{40}, \ldots, \frac{F}{100}, \ldots, \frac{G}{400}\right\}$

More practice, page A-27, Set 50

Investigating the Ideas

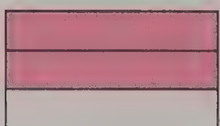
The pictures show some common uses of fractions.



? Can you make a list of other ways fractions are used ?

Discussing the Ideas

1. Can you think of any difficulties we might have if there were no fractions ?

2. 

$\frac{2}{3}$ ← NUMERATOR → $\frac{6}{8}$
DENOMINATOR

In these examples the **numerator** tells how many parts are red. The **denominator** tells how many parts in all. Can you read each fraction in the Investigation and give its numerator and denominator ?

3. Which group of fractions do you think might be called "the eighths" ? "the sixths" ? "the thirds" ? Why ?

1. Give the word or numeral for each blank.

A In $\frac{4}{5}$, the numerator is __?__.

B In $\frac{7}{9}$, 9 is the __?__.

C $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$ are all __?__.

D There are __?__ sixths in $\frac{5}{6}$.

E In $\frac{3}{4}$, 3 is the __?__.

F In $\frac{6}{10}$, the denominator is __?__.

2. Write a fraction for each part of the exercise.

A Denominator: 7
Numerator: 2

B Numerator: 4
Denominator: 10

C Denominator: 12
Numerator: 8

D The denominator is 10, and it is 2 times the numerator.

E The numerator is 6, and the denominator is 3 more than 6.

F The denominator is 100, and the numerator is half that.

3. Copy each set on your paper. Write the missing numerators and denominators to form a set of equivalent fractions.

1	2	3	4	A	B	7	D	9	F
2	4	6	8	10	12	C	16	E	100

1	2	3	4	G	6	I	J	9	100
3	6	9	12	15	H	21	24	K	L

3	6	9	12	15	18	O	P	27	300
5	10	15	20	M	N	35	40	Q	R

3	6	9	12	S	18	U	24	27	X
10	20	30	40	50	T	70	V	W	1000

★ **4.** The sum of the numerator and denominator of a fraction is 10. The denominator is 4 times the numerator. Give the fraction.

1. Give the correct sign (= or ≠) for each ●. The sign ≠ means "is **not** equal to."

A 63 427 + 1000 ● 64 427
B 100 × 1000 ● 1 000 000
C 872 000 ÷ 10 ● 8720
D 1 000 000 ● 999 999 + 1
E 10 000 − 1 ● 99 000
F 6285 × 100 ● 628 500
G 70 × 1000 ● 70 000
H 832 070 − 10 000 ● 831 070
I 10 × 10 × 10 ● 10 000
J 10 000 ● 100 × 100
K 10 × 10 × 10 × 10 ● 100 × 10
L 6322 − 302 ● 6020

2. Find the sums.

A $\begin{array}{r}2\\7\\8\\6\\\hline\end{array}$ B $\begin{array}{r}32\\58\\46\\71\\\hline\end{array}$ C $\begin{array}{r}428\\106\\750\\623\\\hline\end{array}$ D $\begin{array}{r}7465\\8321\\2405\\3106\\\hline\end{array}$ E $\begin{array}{r}82\,471\\93\,265\\47\,721\\65\,132\\\hline\end{array}$

3. Find the differences.

A $\begin{array}{r}75\\-37\\\hline\end{array}$ B $\begin{array}{r}604\\-29\\\hline\end{array}$ C $\begin{array}{r}7028\\-4639\\\hline\end{array}$

4. Find the products.

A $\begin{array}{r}27\\\times 6\\\hline\end{array}$ B $\begin{array}{r}32\\\times 12\\\hline\end{array}$ C $\begin{array}{r}58\\\times 26\\\hline\end{array}$

5. Find the quotients and remainders.

A 283 ÷ 6
B 4286 ÷ 7
C 316 ÷ 13
D 228 ÷ 24

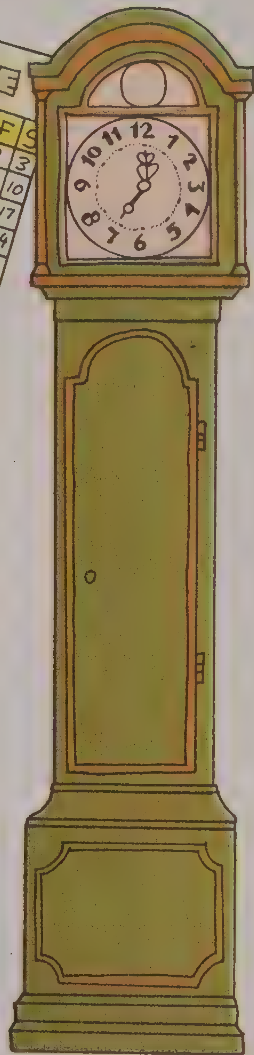
think

The can contains only red beads and black beads.
The beads are mixed up and, without looking, Jan drew out 100 beads, 90 red and 10 black.
Guess how many black beads were in the can at first.

You are invited to explore

ACTIVITY CARD 14
Page 354

TIME



1. There are 24 hours in a day. How many hours are there in a year that has 365 days?

2. There are 7 days in a week. How many weeks are there in a year that has 365 days?

3. John said his brother was 1645 days old.
   A How many days old will John's brother be in another year (365 days)?
   B How many days old was he one year ago?

4. Some years have 365 days, and others have 366 days. How many days are there in 6 years if one of the 6 years has 366 days?

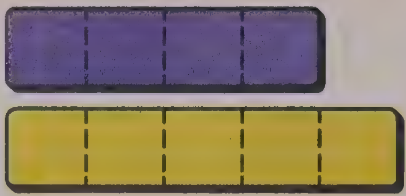
★ 5. There are 60 seconds in one minute and 60 minutes in one hour. How many seconds are there in 24 hours (one day)?

★ 6. How many seconds are there in a week?

★ 7. March has 31 days.
   A Without looking at a calendar, tell what day in April is 3 weeks after March 20.
   B What day in April is 4 weeks after March 10?

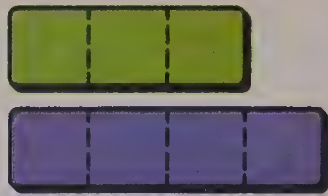
Investigating the Ideas

A



The purple strip is $\frac{4}{5}$ as long as the yellow strip.

B



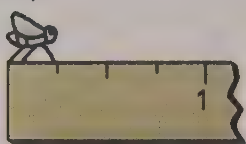
The light green strip is $\frac{3}{4}$ as long as the purple strip.

? Can you use some other pairs of strips and give the fractions that compare them?

Discussing the Ideas

1. What fractions would you use to compare each insect with the unit shown?

A Fly

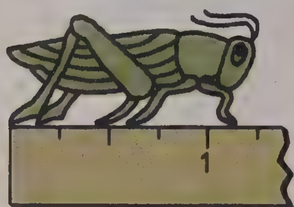


B Ant

C Bee

D Beetle

E Grasshopper



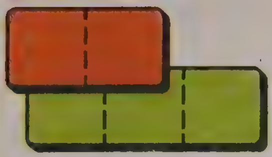
F Dragonfly

2. A fraction with its numerator equal to or greater than its denominator is called an improper fraction.
   A Which of the fractions in exercise 1 would you call improper fractions?
   B Did you find any improper fractions in the Investigation?

Using the Ideas

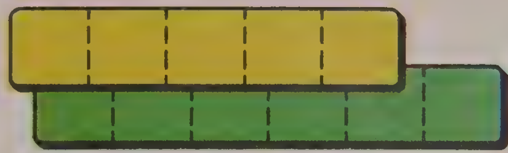
1. Give the missing numerator for each fraction.

A



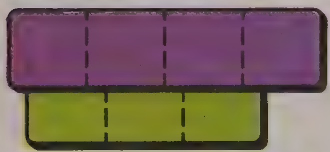
The red strip is $\frac{\square}{3}$ as long as the light green strip.

B



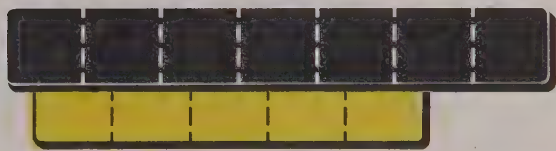
The yellow strip is $\frac{\square}{6}$ as long as the dark green strip.

C



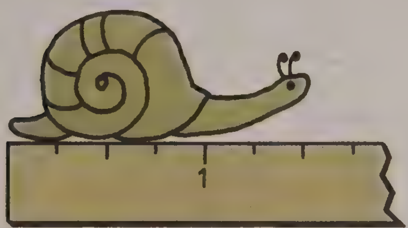
The purple strip is $\frac{\square}{3}$ as long as the light green strip.

D



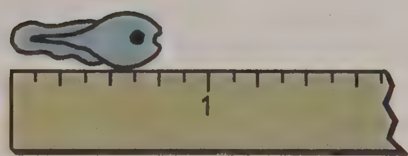
The black strip is $\frac{\square}{5}$ as long as the yellow strip.

E



The fraction $\frac{\square}{4}$ compares the snail with the unit.

F

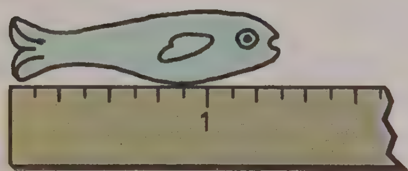


The fraction $\frac{\square}{8}$ compares the tadpole with the unit.

G

The fraction $\frac{\square}{4}$ compares the worm with the unit.

H



The fraction $\frac{\square}{8}$ compares the minnow with the unit.

2. Which of the fractions in exercise 1 are improper fractions?

3. Which is larger, a worm that is 2 units long or one that is $\frac{7}{4}$ units long?

Let's explore different types of fractions.

Investigating the Ideas

These are special sets of equivalent fractions.

TYPE A $\{\frac{0}{1}, \frac{0}{2}, \frac{0}{3}, ?, ?, ?, \ldots\}$

TYPE B $\{\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, ?, ?, ?, \ldots\}$

TYPE C $\{\frac{1}{1}, \frac{2}{2}, \frac{3}{3}, ?, ?, ?, \ldots\}$

TYPE D $\{\frac{2}{1}, \frac{4}{2}, \frac{6}{3}, ?, ?, ?, \ldots\}$

? Can you give the next three fractions for each set of equivalent fractions?

Discussing the Ideas

1. Can you explain what is special about each of the types of fractions in the Investigation?

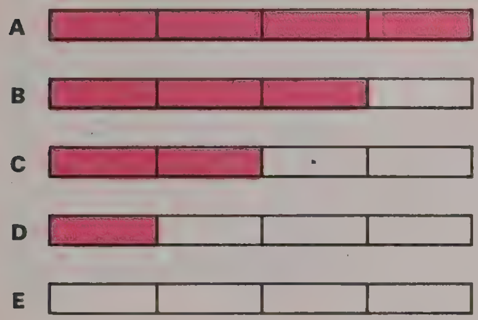
2. A Which type has zero numerators?
   B Which type has numerators (not zero) less than denominators?
   C Which type has numerators greater than denominators?
   D Which type has numerators equal to denominators?

3. Give the fraction that tells what part of each region is red.

A B C D

4. Which type (A, B, C, or D) is each fraction you found in exercise 3? Why?

1. Give a fraction to tell what part of each bar is red.



2. Write the next three fractions.

A $\frac{4}{8}, \frac{5}{8}, \frac{6}{8}, \frac{7}{8}$, ?, ?, ?, .

B $\frac{6}{8}, \frac{5}{8}, \frac{4}{8}, \frac{3}{8}$, ?, ?, ?.

C $\frac{6}{5}, \frac{5}{5}, \frac{4}{5}, \frac{3}{5}$, ?, ?, ?.

D $\frac{6}{10}, \frac{5}{10}, \frac{4}{10}, \frac{3}{10}$, ?, ?, ?.

3. Which of these fractions are improper fractions?

$\frac{3}{4}, \frac{4}{3}, \frac{6}{8}, \frac{7}{8}, \frac{8}{8}, \frac{9}{8}, \frac{5}{10}, \frac{10}{5}, \frac{1}{1}, \frac{7}{6}, \frac{12}{12}, \frac{11}{9}$

For exercises 4 and 5, copy the fractions on your paper. Write three more fractions for each set.

4. A $\{\frac{3}{2}, \frac{6}{4}, \frac{9}{6}, \ldots\}$

B $\{\frac{4}{3}, \frac{8}{6}, \frac{12}{9}, \ldots\}$

C $\{\frac{5}{2}, \frac{10}{4}, \frac{15}{6}, \ldots\}$

D $\{\frac{5}{3}, \frac{10}{6}, \frac{15}{9}, \ldots\}$

E $\{\frac{0}{4}, \frac{0}{8}, \frac{0}{12}, \frac{0}{16}, \ldots\}$

F $\{\frac{3}{5}, \frac{6}{10}, \frac{9}{15}, \frac{12}{20}, \ldots\}$

G $\{\frac{3}{7}, \frac{6}{14}, \frac{9}{21}, \ldots\}$

H $\{\frac{3}{10}, \frac{6}{20}, \frac{9}{30}, \ldots\}$

5. A $\{\frac{1}{1}, \frac{2}{2}, \frac{3}{3}, \ldots\}$

B $\{\frac{2}{1}, \frac{4}{2}, \frac{6}{3}, \ldots\}$

C $\{\frac{3}{1}, \frac{6}{2}, \frac{9}{3}, \ldots\}$

D $\{\frac{4}{1}, \frac{8}{2}, \frac{12}{3}, \ldots\}$

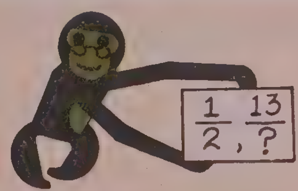
E $\{\frac{10}{1}, \frac{20}{2}, \frac{30}{3}, \ldots\}$

F $\{\frac{25}{1}, \frac{50}{2}, \frac{75}{3}, \ldots\}$

G $\{\frac{50}{1}, \frac{100}{2}, \frac{150}{3}, \ldots\}$

H $\{\frac{100}{1}, \frac{200}{2}, \frac{300}{3}, \ldots\}$

think

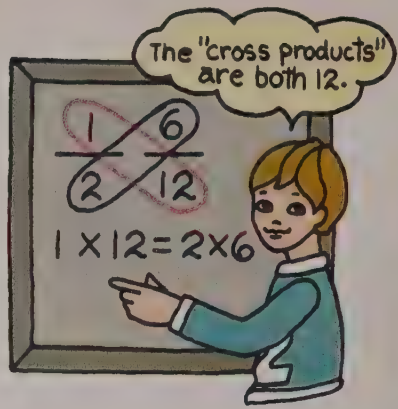


Equivalent fractions you will see
When you view one half and me.
I'm thirteen above the line.
Find the name you think is mine.

WHO AM I?

Investigating the Ideas

Sometimes the two "cross products" of a pair of fractions are equal.

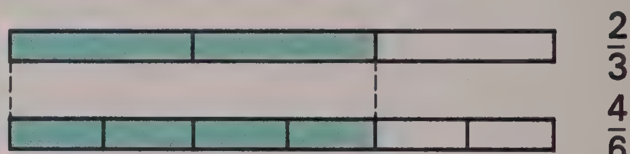


? How many other pairs of fractions can you find and record in which the "cross products" are both 12?

Discussing the Ideas

1. The two fractions, $\frac{1}{2}$ and $\frac{6}{12}$, in the Investigation are equivalent. What do you notice about the pairs of fractions you found?

2. A Does this picture show that $\frac{2}{3}$ is equivalent to $\frac{4}{6}$?

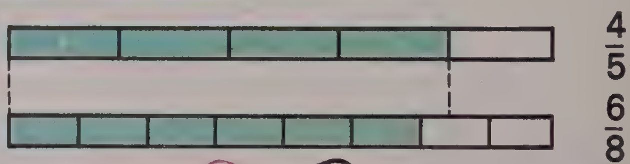


   B How would you complete this sentence?

   $\frac{2}{3}$ $\frac{4}{6}$ → 4 × 3 = ▯
   → 2 × 6 = ▯

If the two "cross products" are the same, then the fractions are __?__.

3. A Does this picture show that $\frac{4}{5}$ is equivalent to $\frac{6}{8}$?



   B Are the "cross products" equal? Are the fractions equivalent?

   $\frac{4}{5}$ $\frac{6}{8}$ → 5 × 6 = ▯
   → 4 × 8 = ▯

If the two "cross products" are not the same, then the fractions are not equivalent.

1. Find the "cross products" that are ringed. Then tell whether the pair of fractions is equivalent or not.

A $\frac{2}{4}$ $\frac{5}{10}$ B $\frac{3}{6}$ $\frac{5}{9}$ C $\frac{1}{2}$ $\frac{6}{12}$ D $\frac{6}{8}$ $\frac{4}{6}$

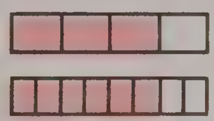
E $\frac{2}{3}$ $\frac{6}{9}$ F $\frac{5}{6}$ $\frac{12}{18}$ G $\frac{2}{5}$ $\frac{8}{20}$ H $\frac{8}{12}$ $\frac{10}{15}$

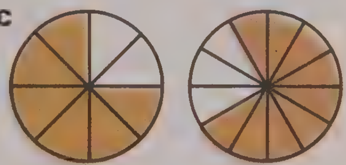
2. Tell whether or not the two fractions are equivalent.

A $\frac{1}{2}$ $\frac{7}{14}$ B $\frac{6}{8}$ $\frac{7}{10}$ C $\frac{3}{3}$ $\frac{8}{8}$ D $\frac{3}{8}$ $\frac{9}{24}$ E $\frac{6}{10}$ $\frac{9}{15}$ F $\frac{0}{9}$ $\frac{0}{1}$

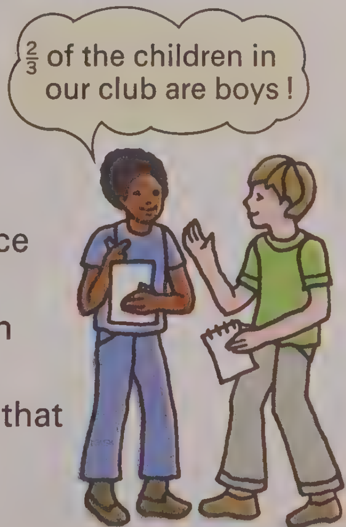
3. For each part of the exercise, write the two fractions suggested by the shaded parts of the two regions given. Then tell whether or not the two fractions are equivalent.

A


B


C


4. There are 30 children in Ann and Janet's class. 15 of the children are girls. Ann said, "$\frac{15}{30}$ of the children are girls." Janet said, "$\frac{3}{6}$ of the children are girls."
   A Use the cross-product method to show that the two fractions are equivalent.
   B Are both girls right?

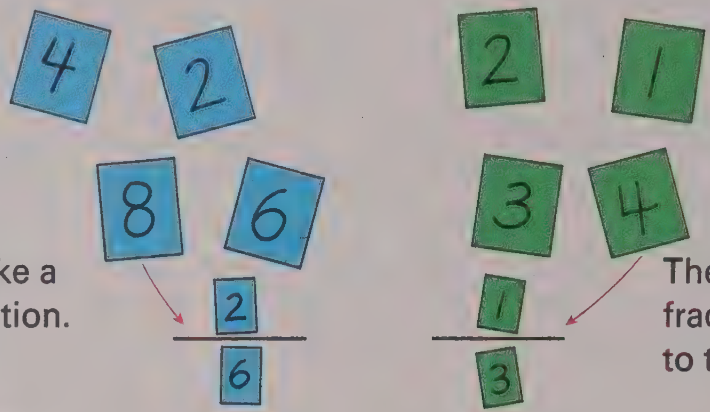


5. Mike and Tim are both in the school science club. Mike said, "$\frac{2}{3}$ of the children in our club are boys." Tim said, "$\frac{7}{10}$ of the children in our club are boys."
   A Use the cross-product method to show that these two fractions are not equivalent.
   B Did one of the boys make a mistake?

Investigating the Ideas

Color and mark slips of paper like these.

Make a fraction.



Then make a different fraction equivalent to the first.

? How many pairs of equivalent fractions can you find in this way?

Discussing the Ideas

1. Each fraction you made from the green set, except with 2 and 4, is a **lowest-terms** fraction. Can you use the green set to make a lowest-terms fraction equivalent to $\frac{2}{4}$?

2. Find a fraction from the green set that is equivalent to each of these.

   A $\frac{5}{10}$ B $\frac{3}{9}$ C $\frac{3}{12}$ D $\frac{4}{12}$ E $\frac{9}{12}$

3. The fraction $\frac{1}{2}$ is the lowest-terms fraction for each fraction in this set. → $\left\{\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \ldots\right\}$

   Find the lowest-terms fraction for each of these sets.

   A $\left\{\frac{1}{4}, \frac{2}{8}, \frac{3}{12}, \frac{4}{16}, \ldots\right\}$ B $\left\{\frac{2}{3}, \frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \ldots\right\}$

1. Build a set of equivalent fractions from each lowest-terms fraction. Find at least six fractions for each set.

A $\frac{1}{2}$ **B** $\frac{2}{3}$ **C** $\frac{1}{5}$ **D** $\frac{3}{10}$ **E** $\frac{5}{6}$ **F** $\frac{7}{4}$

2. In each set, find the fraction for the $\blacksquare$.

A $\{\frac{1}{8}, \frac{2}{16}, \blacksquare, \frac{4}{32}, \ldots\}$

B $\{\frac{5}{4}, \frac{10}{8}, \frac{15}{12}, \blacksquare, \ldots\}$

C $\{\frac{1}{1}, \blacksquare, \frac{3}{3}, \frac{4}{4}, \ldots\}$

D $\{\frac{0}{1}, \frac{0}{2}, \frac{0}{3}, \blacksquare, \ldots\}$

E $\{\frac{2}{1}, \frac{4}{2}, \blacksquare, \frac{8}{4}, \ldots\}$

F $\{\frac{5}{8}, \blacksquare, \frac{15}{24}, \ldots\}$

G $\{\blacksquare, \frac{2}{18}, \frac{3}{27}, \ldots\}$

H $\{\blacksquare, \frac{4}{14}, \frac{6}{21}, \ldots\}$

I $\{\blacksquare, \frac{6}{4}, \frac{9}{6}, \ldots\}$

J $\{\blacksquare, \frac{12}{10}, \frac{18}{15}, \ldots\}$

3. Give the lowest-terms fraction for each part of exercise 2.

4. Find the lowest-terms fraction in each set.

A $\{\frac{8}{12}, \frac{20}{30}, \frac{14}{21}, \frac{6}{9}, \frac{2}{3}\}$

B $\{\frac{15}{20}, \frac{3}{4}, \frac{9}{12}, \frac{21}{28}, \frac{12}{16}\}$

C $\{\frac{10}{100}, \frac{2}{20}, \frac{1}{10}, \frac{5}{50}, \frac{7}{70}\}$

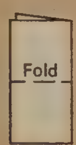
D $\{\frac{80}{100}, \frac{8}{10}, \frac{40}{50}, \frac{16}{20}, \frac{4}{5}\}$

think

Cut out of a sheet of notebook paper a square about 20 cm on each side. Then:

[1] Fold it once.

[2] Fold it again.



[3] Hold the corner with four tips and fold along the diagonal.

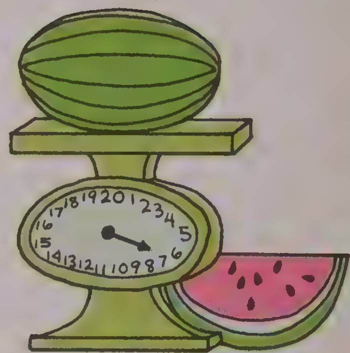
[4] Now unfold it and **color it** to answer this question.
How can **exactly half** of a square window be painted so that the unpainted part remains a perfect square ?

More practice, page A-27, Set 51

Fraction Exercises

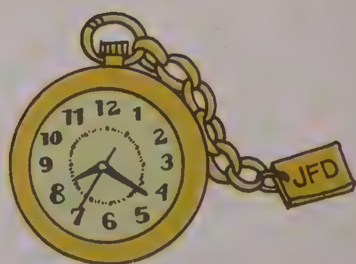
1. Write a fraction for each ▥.
(Example: A second is $\frac{1}{60}$ of a minute.)

A A minute is ▥ of an hour.
B An hour is ▥ of a day.
C A day is ▥ of a week.
D A month is ▥ of a year.
E A year is ▥ of a decade.
F A decade is ▥ of a century.
G A centimetre is ▥ of a decimetre.
H A decimetre is ▥ of a metre.
I A metre is ▥ of a kilometre.
J A gram is ▥ of a kilogram.



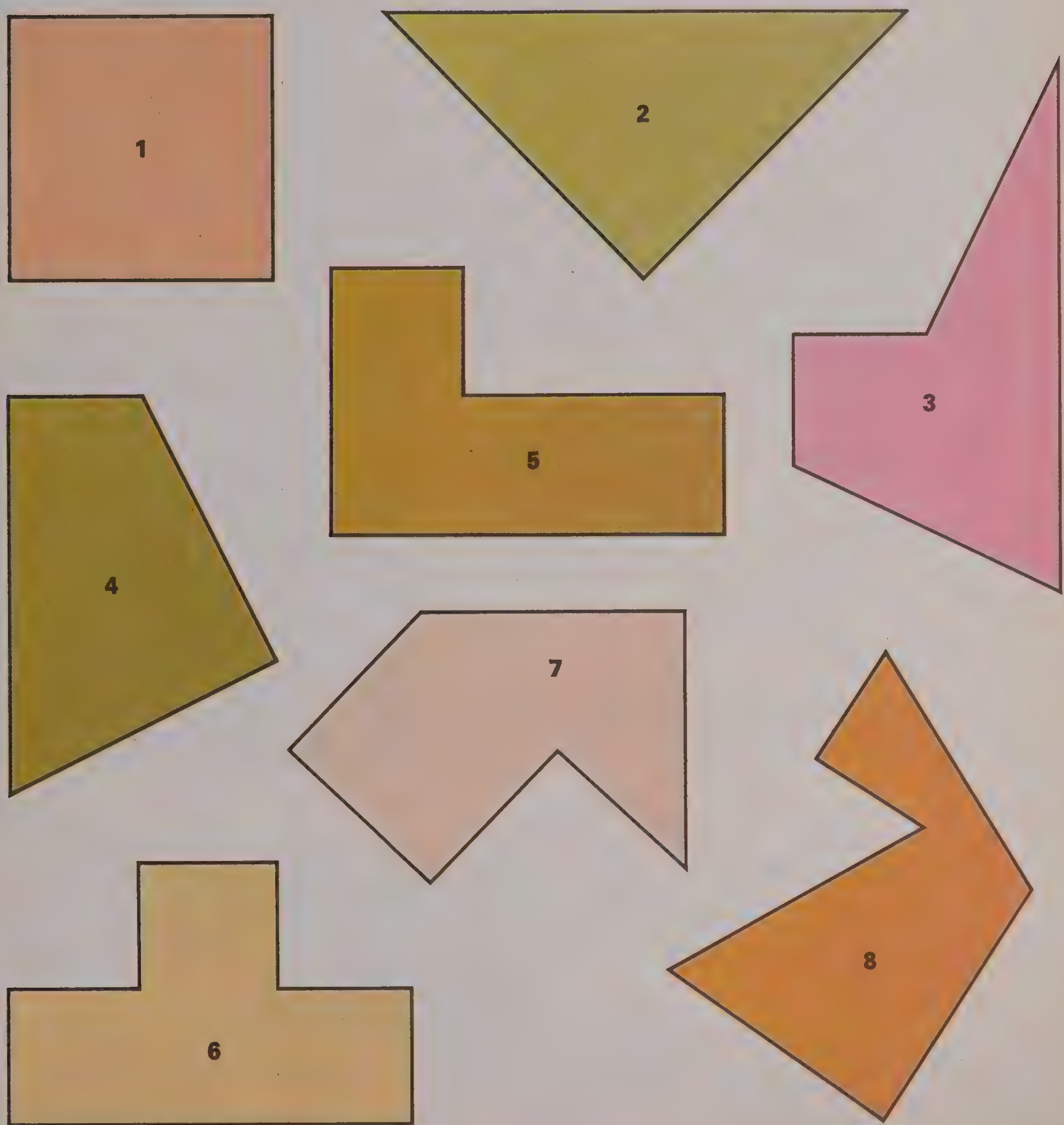
★ **2.** Give the lowest-terms fraction for each ▥.

A 4 months is ▥ of a year.
B 40 minutes is ▥ of an hour.
C 400 grams of steak weigh ▥ of a kilogram.
D 30 centimetres is ▥ of a metre.
E 5 decimetres is ▥ of a metre.
F 100 metres is ▥ of a kilometre.
G A quarter is ▥ of a dollar.
H A dime is ▥ of a dollar.
I A nickel is ▥ of a dollar.
J 50 centimetres is ▥ of a metre.
K 12 seconds is ▥ of a minute.
L A half centimetre is ▥ of a metre.



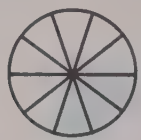
FUN WITH FOURTHS

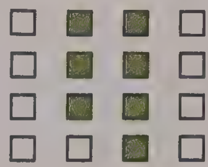
Each piece is exactly $\frac{1}{4}$ of a square. Trace and cut out four copies of each, and see if you can put them together to form a square.

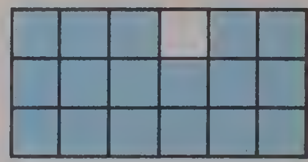


Reviewing the Ideas

1. Give a fraction to tell what part of each picture is shaded.

A 

B 

C 

2. Give a fraction to tell what part of each bar is shaded.

A 

B 

C 

3. Use the cross-product method to show that your fractions in exercise 2 are equivalent.

4. Give three more fractions for each set.

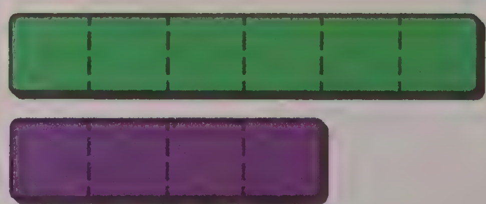
A $\{\frac{3}{7}, \frac{6}{14}, \frac{9}{21}, \ldots\}$

B $\{\frac{4}{5}, \frac{8}{10}, \frac{12}{15}, \ldots\}$

5. Tell whether or not the two fractions are equivalent.

A $\frac{2}{4}$ $\frac{8}{16}$ B $\frac{8}{3}$ $\frac{25}{9}$ C $\frac{10}{8}$ $\frac{15}{12}$ D $\frac{7}{8}$ $\frac{21}{16}$

6. Give an improper fraction that tells how the dark green strip compares with the purple strip.



7. Write a set of six equivalent fractions for each lowest-terms fraction.

A $\frac{1}{2}$ B $\frac{1}{4}$ C $\frac{2}{3}$ D $\frac{3}{4}$ E $\frac{7}{8}$ F $\frac{3}{10}$

think

I like to think that I am big,
But no one will agree.
One in a million is your clue.
Use lowest terms for me.

WHO AM I?

1. Canada has ten provinces. Two of them border on James Bay. Give two fractions that tell what part of the provinces border on James Bay.

2. Ontario touches four of the five Great Lakes. What fraction of the lakes touch Ontario ? What fraction of the lakes do not touch Ontario ?

3. Eight of the provinces have a seacoast. Give two fractions to tell what part of the provinces this is.

4. Seven of the provinces border on the United States. What fraction of the provinces share some border with the United States ? What fraction of the provinces do not share a border with the United States ?

5. Five provinces have seacoasts on the Atlantic Ocean. Give two fractions to tell what part of the provinces are on the Atlantic Ocean.

1. Give the correct sign (+, −, ×, ÷) for each ■.

A 48 ■ 48 > 100	F 764 ■ 764 < 1	K 1 ■ 1 < 1
B 127 ■ 29 = 98	G 168 ■ 12 < 156	L 4500 ■ 12 < 4000
C 564 ■ 1 > 564	H 67 ■ 35 = 102	M 10 ■ 100 = 1000
D 329 ■ 0 ≠ 329	I 369 ■ 7 > 376	N 1000 ■ 1 = 999
E 0 ■ 28 > 0	J 0 ■ 1 ≠ 0	O 12 ■ 12 > 140

2. Find the length of each segment to the nearest half centimetre.

A

B

C

D

E

F

3. Find the sums and differences.

A 347 + 685	B 982 − 643	C 803 − 265	D 8654 + 7283	E 9402 − 657
F 842 − 764	G 927 + 849	H 600 − 475	I 8020 − 6735	J 9830 + 7692

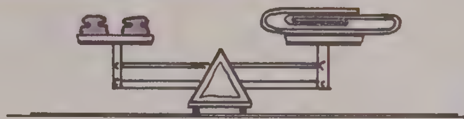
4. Find the products and quotients.

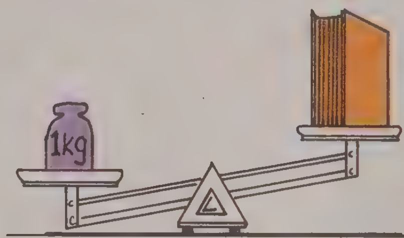
A 83 × 5	G 545 ÷ 5	M 128 ÷ 34	S 527 ÷ 62
B 648 ÷ 4	H 207 ÷ 25	N 3276 × 51	T 1346 × 37
C 76 × 13	I 2816 × 27	O 600 ÷ 70	U 435 × 6
D 108 ÷ 12	J 264 ÷ 52	P 4379 × 68	V 252 ÷ 12
E 319 × 7	K 9024 × 35	Q 700 ÷ 73	W 3412 × 12
F 4285 × 3	L 391 ÷ 43	R 3269 × 48	X 4444 ÷ 4

Weights

1 kilogram (kg) is 1000 grams(g).
1 tonne (t) is 1000 kilograms.

A gram has less weight than a paperclip.
A paperclip weighs about 2 grams.





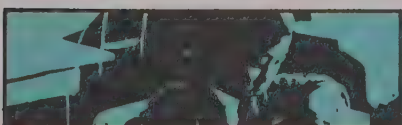
A kilogram weighs a little more than this book.
The weight of your book is $\frac{4}{5}$ that of a kilogram.

A tonne weighs less than most small cars.

This car  weighs $1\frac{1}{4}$ tonnes.

What unit would you use to weigh

- A a piece of meat?
- B your pencil?
- C a truck?
- D a bag of candy?
- E your desk?
- F a piece of paper?
- G yourself?



You are invited to explore

ACTIVITY CARD 15
Page 354

13 Geometry and Graphing

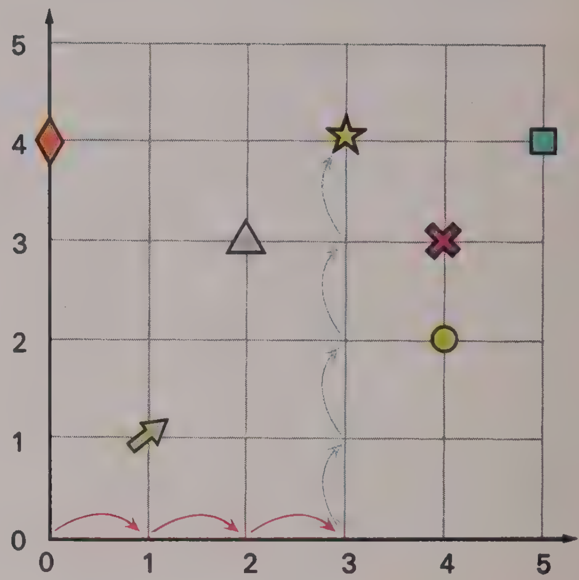
How can number pairs show locations?

Investigating the Ideas

Where is the star?

"3 **over** ( ) and 4 **up** ( )"

Its **co-ordinates** are (3, 4).



? Can you give the co-ordinates to show the locations of the other figures?

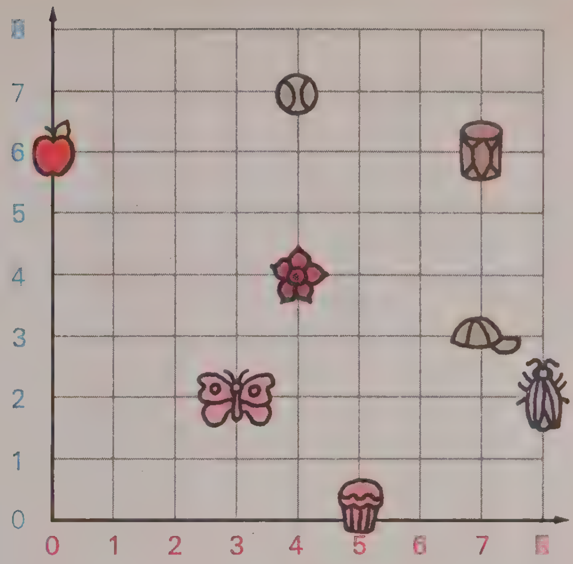
Discussing the Ideas

1. To give co-ordinates, we write the "over" number first and the "up" number second. Explain how the location (4, 3) is different from the location (3, 4).

2. If someone said, "The co-ordinates of the **triangle** in the Investigation are (3, 2)," would he be correct? Explain.

3. A What are the co-ordinates of the figure that is farthest from (5, 5)?
   B What figure is farthest from (0, 0)?

1. Give the missing numbers. Then give the co-ordinates.



A The butterfly is 3 over and ▒ up.
The co-ordinates for the butterfly are ___ ?___.

B The cap is ▒ over and 3 up. The co-ordinates for the cap are ___ ?___.

C The beetle is 8 over and ▒ up.
The co-ordinates for the beetle are ___ ?___.

D The drum is ▒ over and 6 up.
The co-ordinates for the drum are ___ ?___.

E The cupcake is 5 over and ▒ up.
The co-ordinates for the cupcake are ___ ?___.

F The apple is 0 over and ▒ up.
The co-ordinates for the apple are ___ ?___.

G What are the co-ordinates for the flower ? for the ball ?

2. A Give the co-ordinates for *K*.

B What letter is 9 over and 3 up ?

C What letter has co-ordinates (5, 5) ?

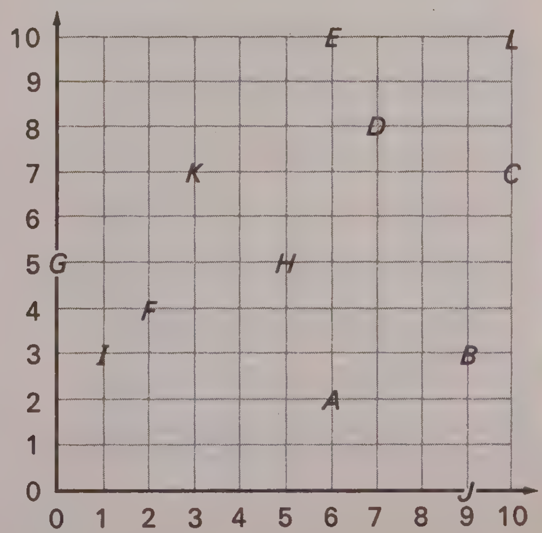
D Give the co-ordinates for *C*.

E What do you find at (9, 0) ?

F What letter has 2 as its first co-ordinate ?

G What letter is at (0, 5) ?

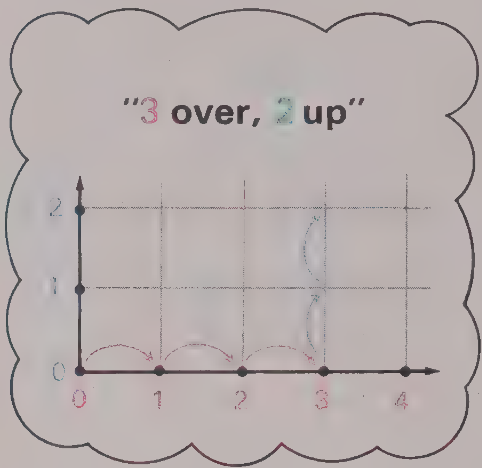
H Give the co-ordinates for *A*, *D*, and *L*.



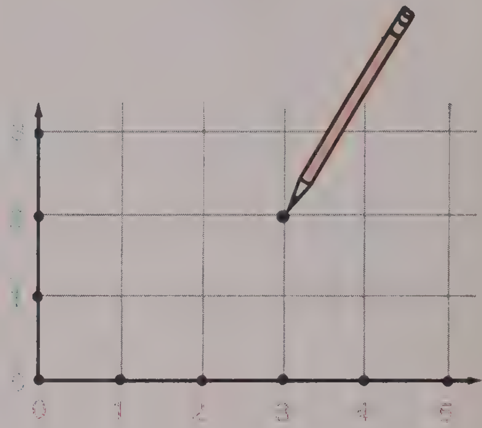
Discussing the Ideas

To **graph** the point with co-ordinates (3, 2)

THINK

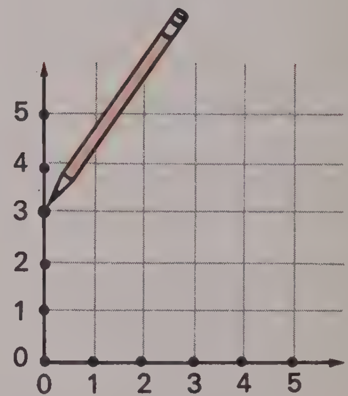


DRAW



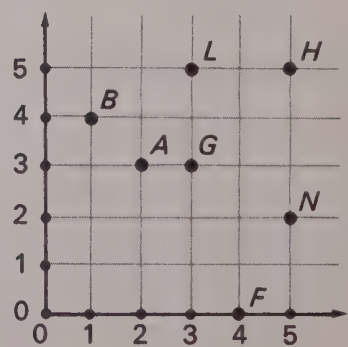
1. How would you explain to someone how to graph the point (5,2) ?

2. This picture shows a point being graphed. Explain how you could think about it to figure out the co-ordinates of the point.

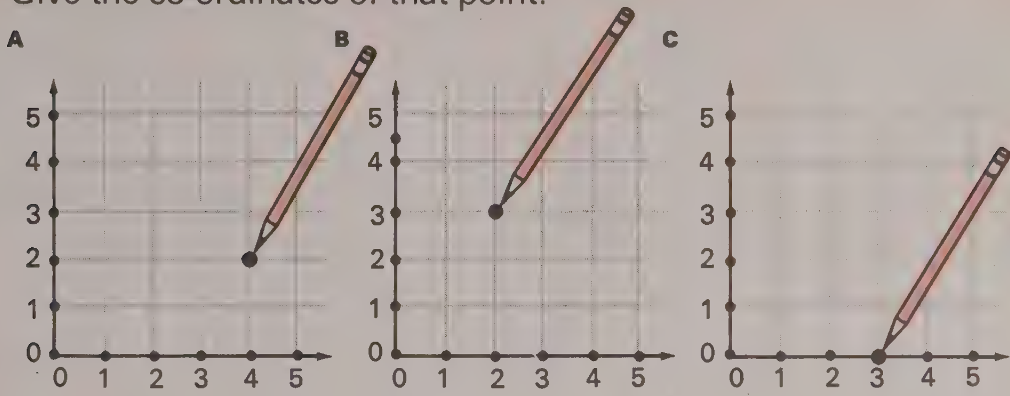


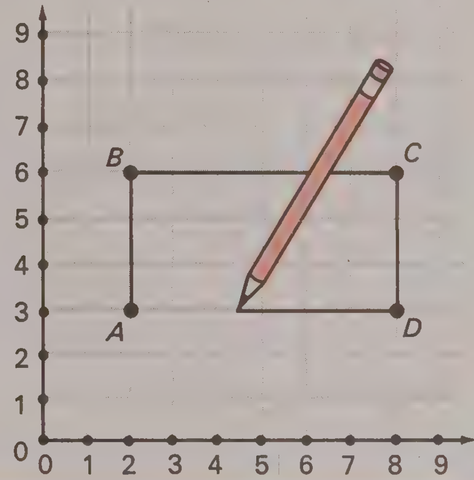
3. Match the letters of the points with the co-ordinates.

(1,4)	(4,0)
(5,2)	(3,3)
(2,3)	(5,5)



1. Each figure below shows a point being graphed. Give the co-ordinates of that point.





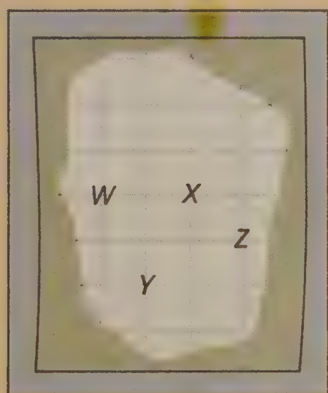
2. A The figure shows points *A*, *B*, *C*, and *D* being connected to form a geometric figure. What is this figure?

   B Label your graph paper as shown here. Then graph points and connect them to form each of these figures: **triangle, right triangle, square, parallelogram.**

think

1. If the co-ordinates of *W* are (5,6), what are the co-ordinates of *X*? of *Y*? of *Z*?

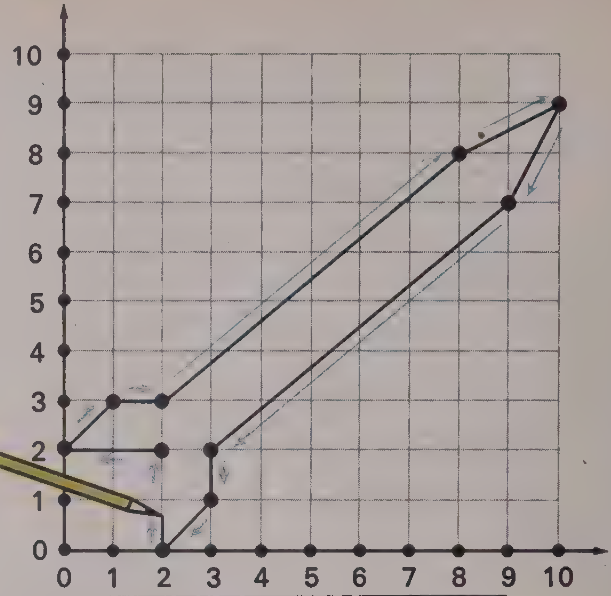
2. If the co-ordinates of *Z* are (7,5), what are the co-ordinates of *W*? of *X*? of *Y*?



Investigating the Ideas

This picture was made by connecting these points in order:

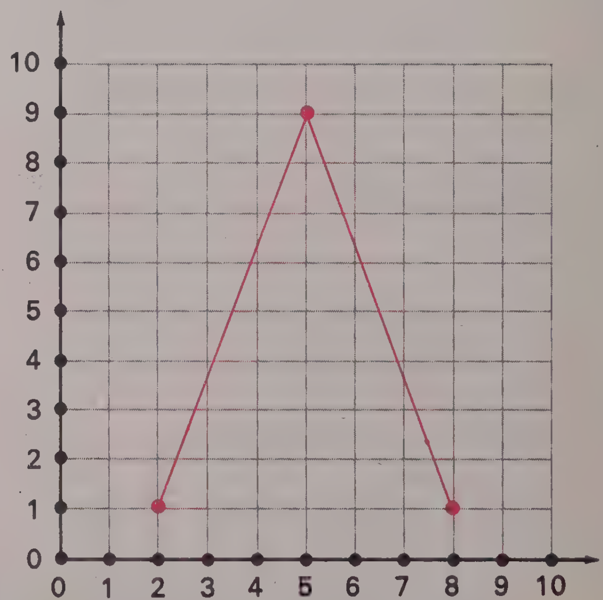
(2, 2) START → (0, 2) → (1, 3)
→ (2, 3) → (8, 8) → (10, 9)
→ (9, 7) → (3, 2) → (3, 1)
→ (2, 0) → (2, 2) END



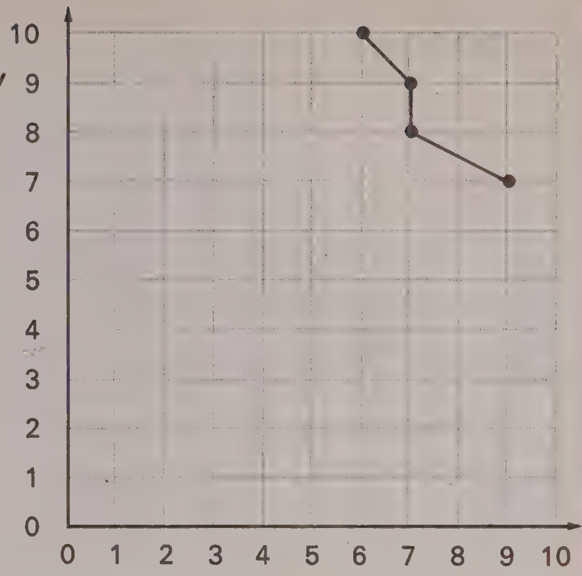
? Can you make a picture by connecting these points in order? (4, 0) → (5, 3) → (7, 1) → (8, 1) → (8, 2) → (9, 1) → (10, 2) → (9, 4) → (5, 8) → (5, 10) → (4, 8) → (3, 10) → (0, 4) → (4, 0)

Discussing the Ideas

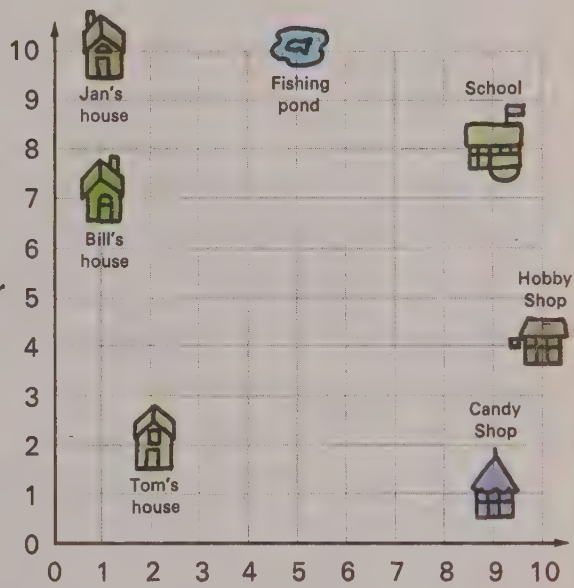
1. The first 3 points have been graphed and connected. How would you complete the picture?
   (2, 1) → (5, 9) → (8, 1)
   → (1, 6) → (9, 6) → (2, 1)
2. What is the completed figure in Question 1?
3. Give the co-ordinates of four points that could be connected to form a
   A square. B rectangle.



1. The first 4 points have been graphed and connected. Copy and complete the picture on your graph paper.
(6, 10) → (7, 9) → (7, 8)
→ (9, 7) → (7, 7) → (8, 5)
→ (9, 4) → (8, 4) → (8, 3)
→ (7, 3) → (8, 2) → (8, 1)
→ (6, 1) → (6, 0) → (3, 0)
→ (3, 2) → (1, 4) → (1, 8)
→ (3, 10) → (6, 10)



2. Make a graph like this and label the spots shown. (You may want to use large dots • instead of pictures.)
   A Connect these dots in order to show the route Tom took on his way to school.
   (2, 2) → (9, 2) → (9, 1)
   → (10, 1) → (10, 4) → (1, 4)
   → (1, 7) → (5, 7) → (5, 8)
   → (9, 8)



★ **B** Give the points for the path you would take to school if you were Tom or Jan. (Choose one.)

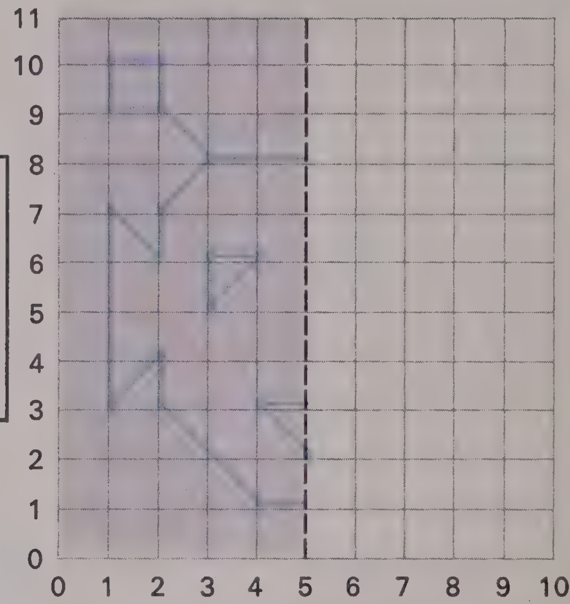
★ **C** Give the points for one of the shortest paths (along the gray lines) from Tom's house to school.

★ 3. Invent a picture and list the co-ordinates for the picture. Then see if a classmate can draw the picture.

Can you draw the other half of a symmetric figure?

Investigating the Ideas

? Can you copy this half of a symmetric figure on your graph paper, and then draw the other half?



Discussing the Ideas

1. Explain the method you used to complete the figure in the Investigation.

2. In the picture above:

A What are the co-ordinates of the point at the corner of the "Martian's" mouth?

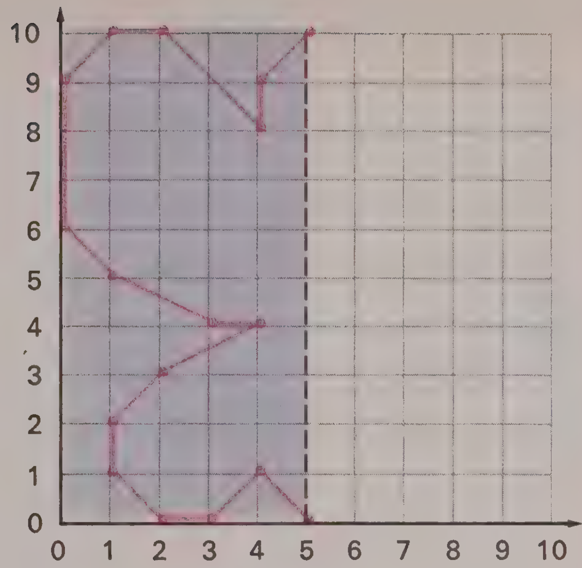
B How can you find the co-ordinates of the point that matches this point in the other half of the picture?

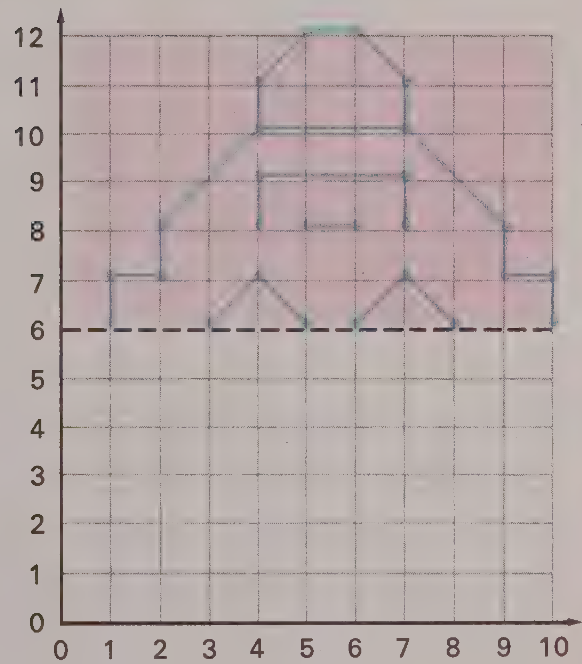
C What are the co-ordinates of the point at the upper tip of the "Martian's" ear?

D Explain how to find the co-ordinates of the point that matches this point in the other half of the picture.

1. A Copy this half of a symmetric figure on your graph paper and draw the other half.

   B What point in the other half matches the point (2, 10) ?





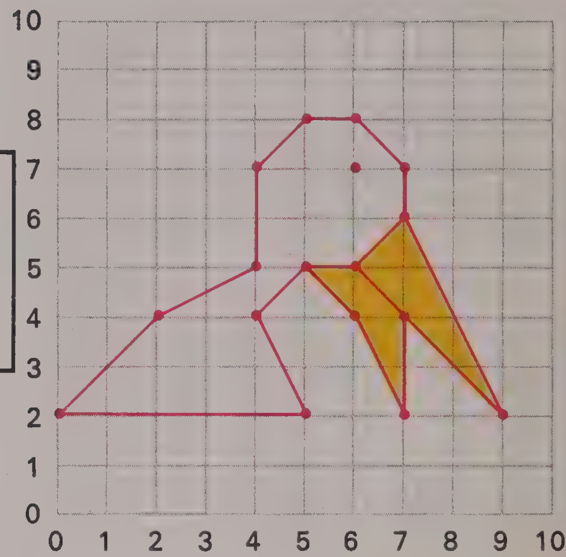
2. A Copy this top half of a symmetric figure on your graph paper and draw the other half.

   B What point in the other half matches the point (4, 9) ?

★ 3. Draw half of a symmetric figure on a piece of graph paper. Then have a classmate try to draw the other half.

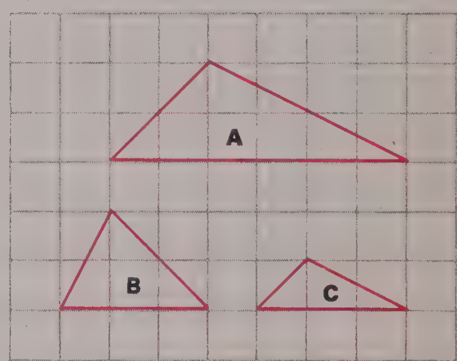
Investigating the Ideas

? Can you use graph paper and make a picture of "Gorgeous Goose" like this, but larger?



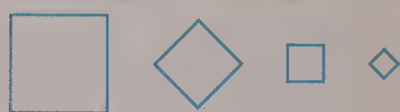
Discussing the Ideas

1. When two figures differ only in size, the figures are similar to each other. Which two triangles are similar?

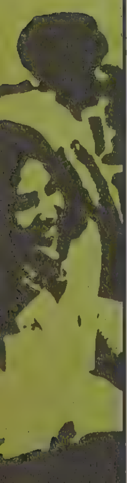


2. Can you find two shapes in your classroom that are similar?

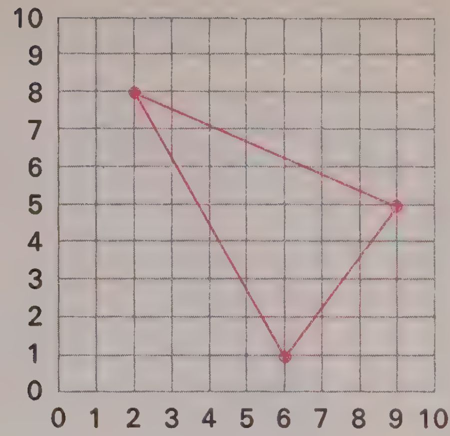
3. Jack said, "Any two squares that I draw will be similar to each other." Do you think Jack is correct?

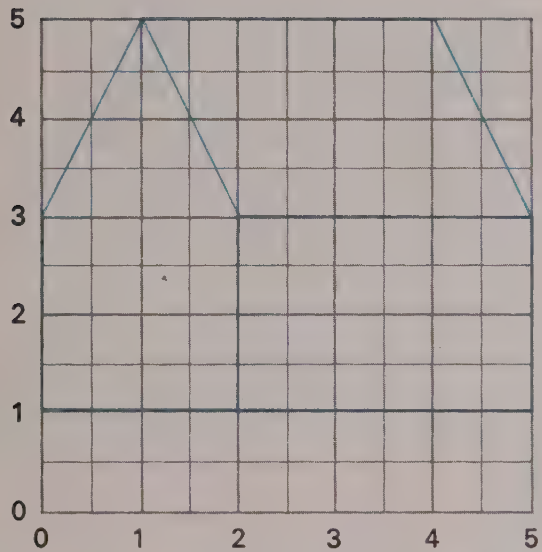


4. How might you make a picture like the one in the Investigation, but smaller?



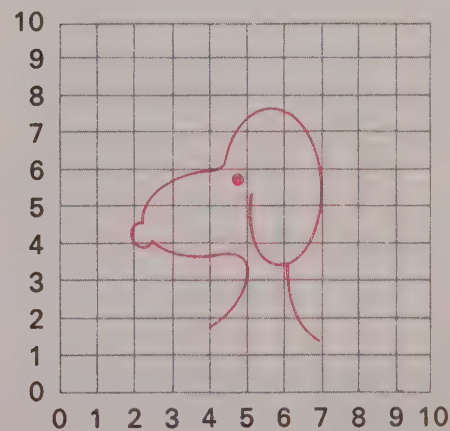
1. Use graph paper to make a larger figure similar to this one.





2. A Use graph paper to make a smaller figure similar to this one.
   B Make a larger figure similar to this one.

★ 3. Can you use graph paper to help you make a larger picture of this little dog?



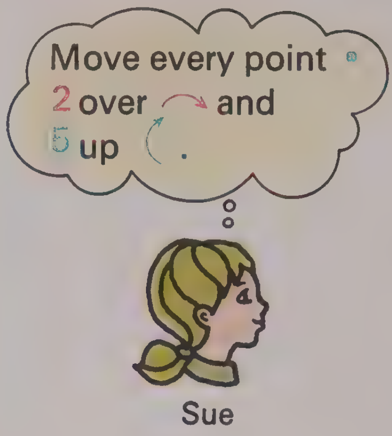
think

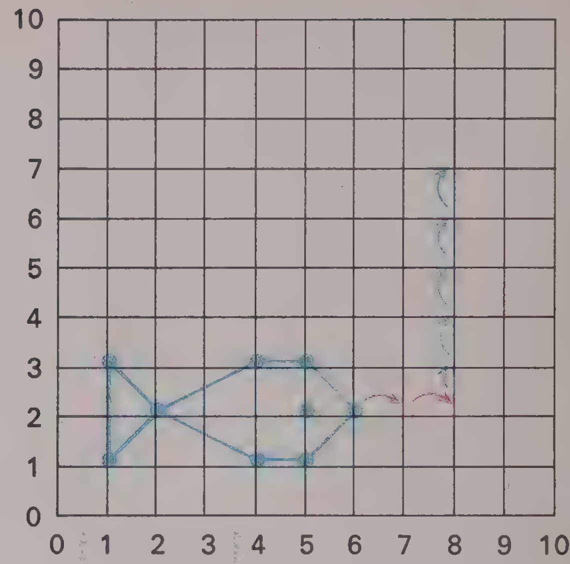
Start with:	2
Double it:	4
Double again:	8
Double again:	16

After 3 doubles, you're at 16.
Guess where you'll be after 10 doubles. Were you correct?

Can you change the positions of figures?

Investigating the Ideas





? Can you show on your graph where the fish will be after Sue moves all the points and connects them?

Discussing the Ideas

1. A The eye of the fish is at what point on the graph?
   B At what point will the eye be after it is moved?

2. A At what point on the graph is the top tip of the tail?
   B Where will this tip be after it is moved?

3. Is the fish larger or smaller after the move? Explain.

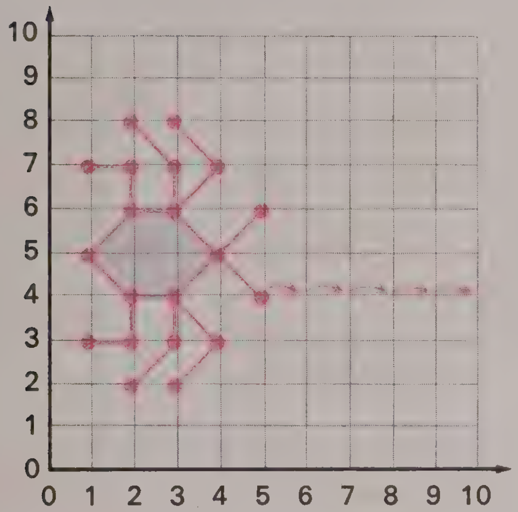
4. Is the fish a different shape after the move?

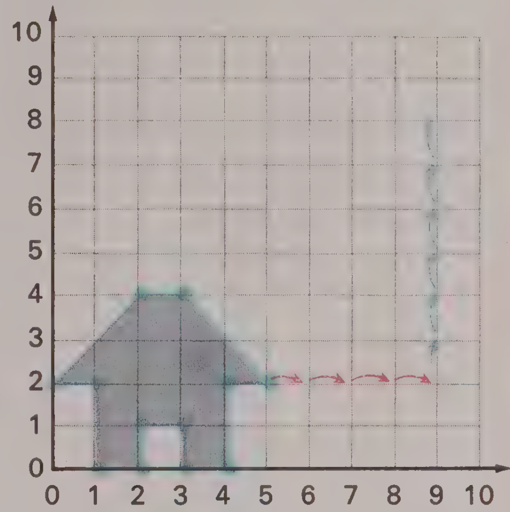
5. Choose another move like the one Sue used, and show where it takes the fish.

1. Use the move given and show the final position of the picture on your graph.

A Move every point 5 over and 0 up.

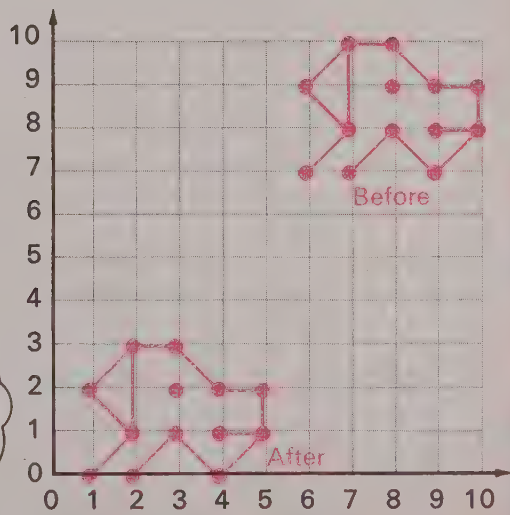
B Move every point 4 over and up.





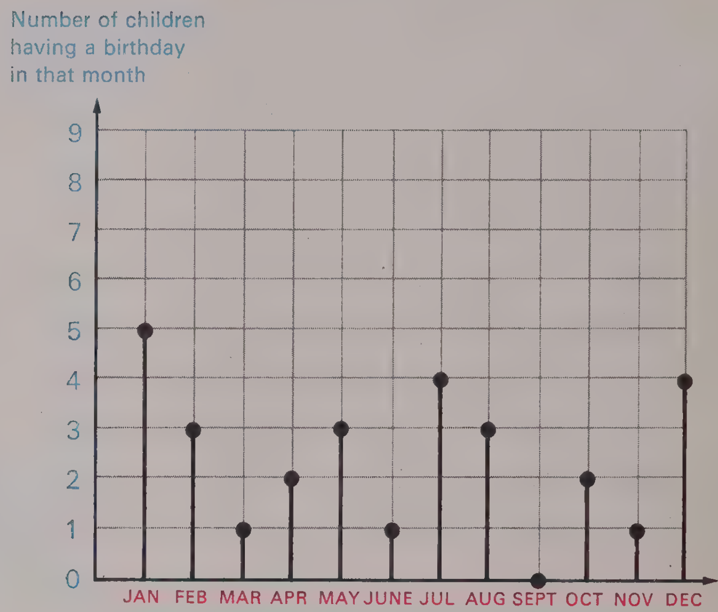
2. The picture before and after the move is shown. Can you complete the description of the move?

Every point was moved over and down.

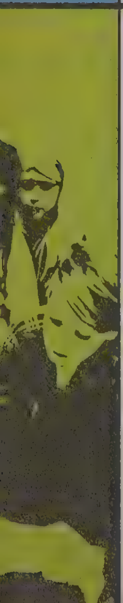


Investigating the Ideas

This graph tells a story about birthdays of Jack's classmates.



? Can you make a graph like this one to show the birthdays of your classmates?



Discussing the Ideas

1. A In what month does Jack's class have the most birthdays?
   B In what month does your class have the most birthdays?

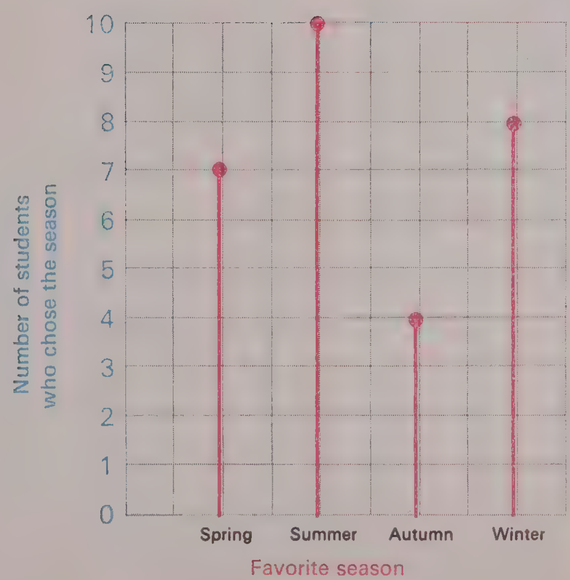
2. Can you answer questions 1A and 1B for **fewest** birthdays?

3. How can you use the graph to find how many students are in Jack's class?

4. What other information can you find in the graph?

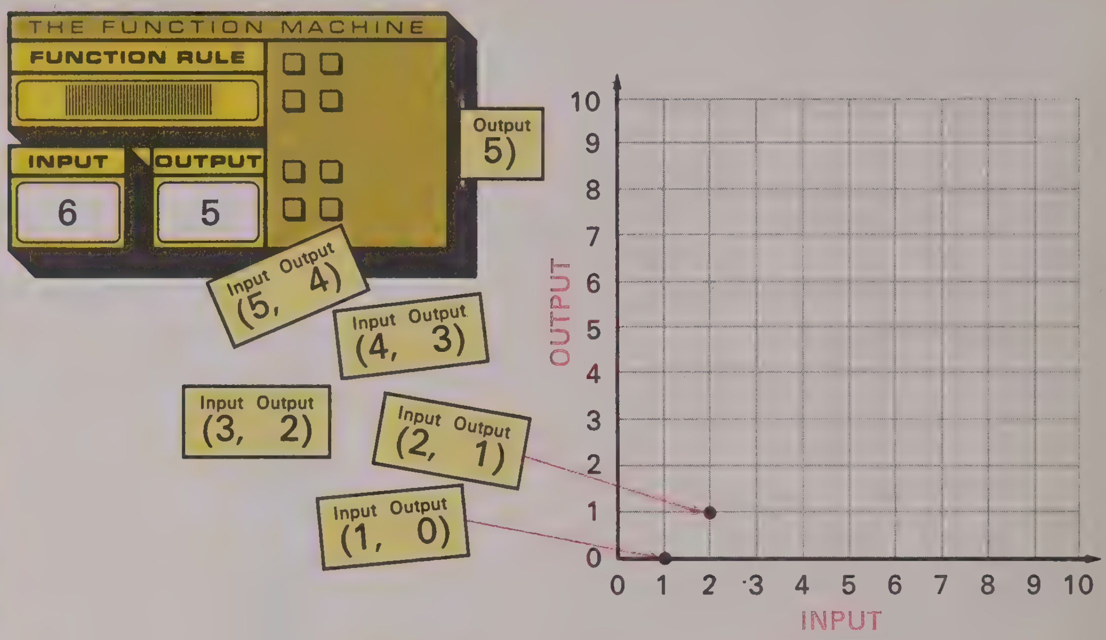
1. Bob counted four people in his class with blue eyes. He started a graph like this.
   A Make a graph like this to show the colors of the eyes of the children in your class.
   B What does your graph tell you?

2. Val asked each of her classmates to name his favorite season of the year. Then she made a graph like this.
   A Make a graph like this one to show your classmates' favorite seasons.
   B Which season was chosen most often in your class?
   C Which season was chosen least often in your class?



Can you show function machine pairs on a graph?

Investigating the Ideas



? Can you discover the function rule and give some other input-output pairs for the function machine cards?

Mark the points for all input-output pairs on a graph as shown.

Discussing the Ideas

1. What pair is on the card coming out of the function machine? Where will you mark the point for this pair?

2. What are some other pairs on the cards that might come from the machine?

3. Do you think the points on the graph have a pattern? Describe it.

1. Think about the function machine. Copy and complete the number pairs for each set of 8 input-output cards. Then graph the points for each set of cards.

A Function Rule: Subtract 2

Input Output
(2, ▥)
(3, ▥)
(4, ▥)
(5, ▥)
(6, ▥)
(7, ▥)
(8, ▥)
(9, ▥)

B Function Rule: Divide by 2

Input Output
(0, ▥)
(2, ▥)
(4, ▥)
(6, ▥)
(8, ▥)
(10, ▥)
(12, ▥)
(14, ▥)

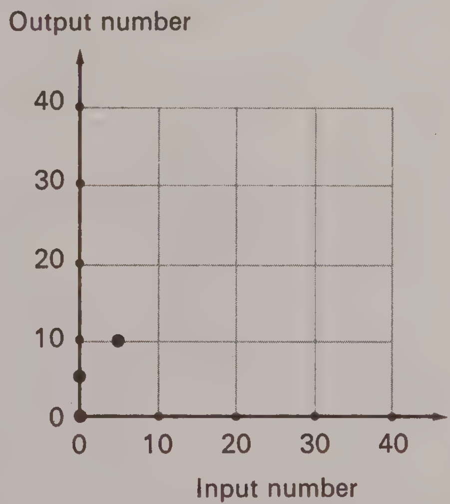
C Function Rule: Subtract from 9

Input Output
(0, ▥)
(1, ▥)
(2, ▥)
(3, ▥)
(4, ▥)
(5, ▥)
(6, ▥)
(7, ▥)

★ 2. Copy and complete the number pairs. List the co-ordinates. Copy and complete the graph of this function.

Function Rule: Add 5

Input Output
(0, 5) → (0, 5)
(5, ▥) → (5, ▥)
(10, ▥) → (10, ▥)
(15, ▥) → (15, ▥)
(20, ▥) → (20, ▥)
(25, ▥) → (25, ▥)
(30, ▥) → (30, ▥)
(35, ▥) → (35, ▥)



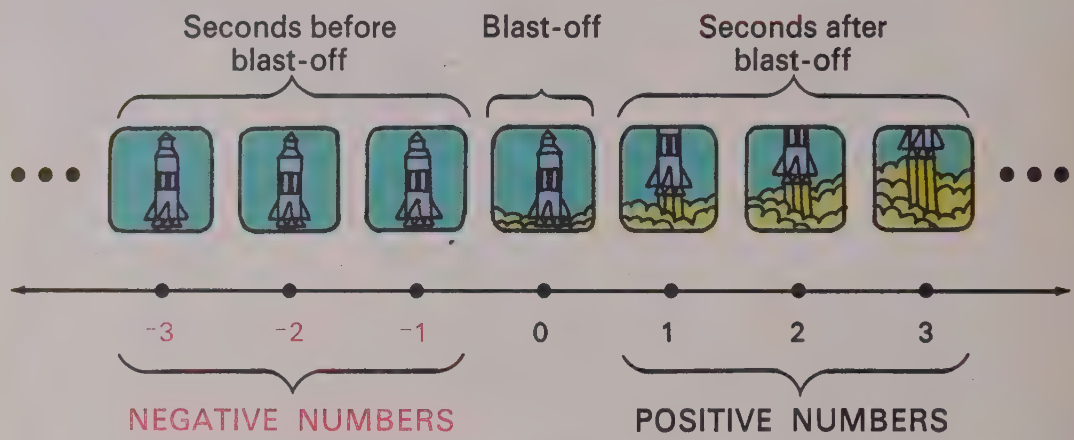
★ 3. Make your own list of number pairs for this function rule:

Multiply the number by itself.

Use input numbers 0, 1, 2, 3, 4. Draw the graph for this function.

Discussing the Ideas

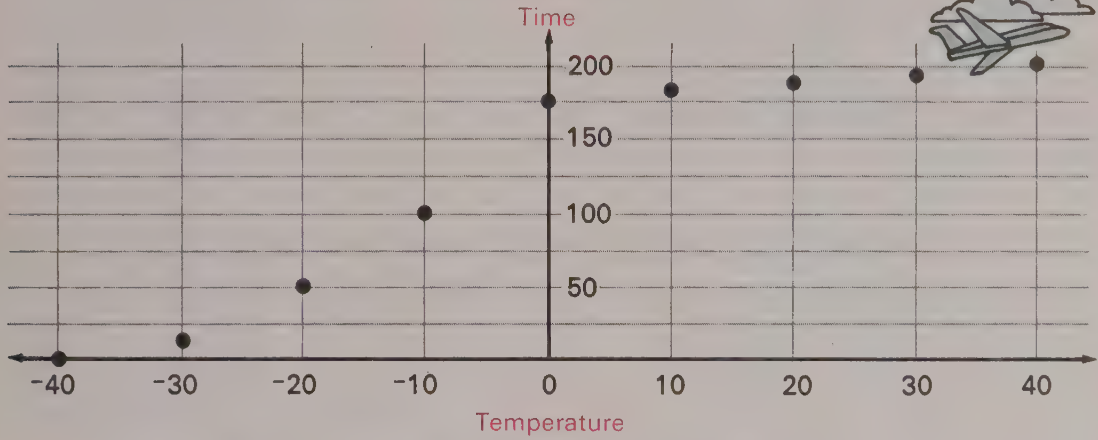
Eric watched as a moon rocket launching was shown on television. He drew a number line to show how **negative** and **positive** numbers can be used to describe the seconds **before** and **after** blast-off.



We read $^{-}3$ as "negative three." We read $^{-}2$ as "negative two."

1. Can you write and say at least five more negative numbers?
2. Can you think of some other times when you could use negative numbers?
3. Maria and Nancy played a game. Maria's score was $^{-}7$ points, and Nancy's score was 5. Who do you think won the game? Why?
4. If you use positive numbers to show an amount of money saved, what will negative numbers show?
5. If you use negative numbers to show the number of steps you walk toward the north, what will positive numbers show?

1. The graph below shows the approximate changes in temperature on a cold January morning. Negative numbers indicate the temperature below freezing and positive numbers indicate the temperature above.



A What was the temperature at 4:00?
What are the co-ordinates of that point?

B What was the temperature at 9:00?
What are the co-ordinates of that point?

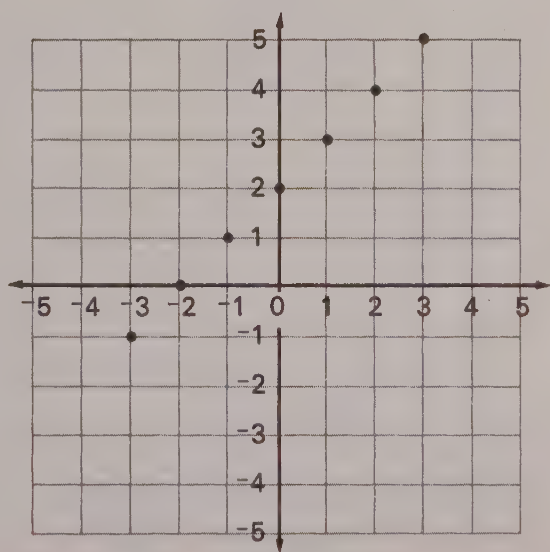
C What do co-ordinates (−1° C, 6:00) tell you?

★ 2. Complete the function table.
The graph may help you.

Function Rule

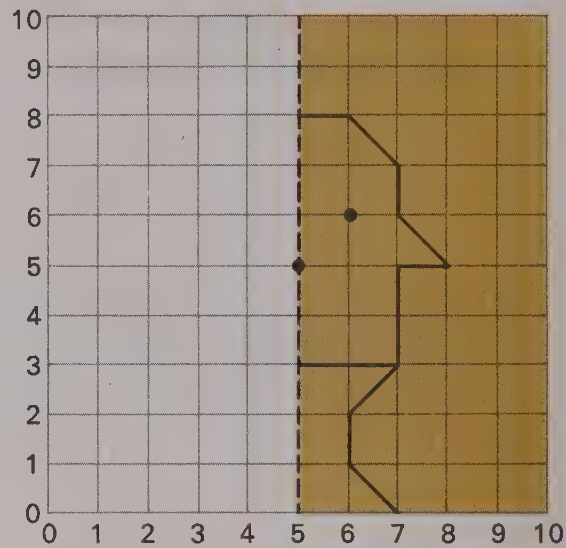
Add 2

Input	Output
3	5
2	4
1	
0	
−1	
−2	
−3	

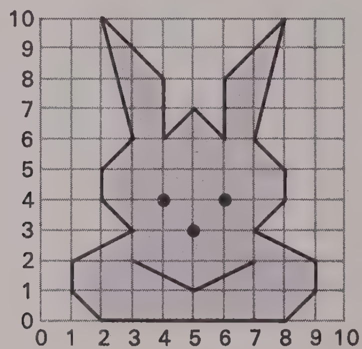


1. A Copy this half of the picture on your graph paper. Then graph the other half.
   B On your graph paper, show the final position of the complete picture after this move:

   Move every point 4 over and 2 up.



2. Use your graph paper to make a larger figure similar to this one.



3. Group the children in your class according to color of hair — blond, brown, black, or red. Make a graph to show the number of children in each group.

4. Graph these points and connect them in order to form a very common message.

   $(1, 4) \rightarrow (3, 7) \rightarrow (3, 9) \rightarrow (2, 7) \rightarrow (3, 4) \rightarrow (4, 5) \rightarrow (3, 6)$
   $\rightarrow (5, 6) \rightarrow (6, 4) \rightarrow (7, 6) \rightarrow (7, 2) \rightarrow (6, 1) \rightarrow (6, 2) \rightarrow (9, 5)$
   $\rightarrow (8, 6) \rightarrow (8, 5) \rightarrow (9, 4) \rightarrow (10, 4)$

1. Find the products.

A $\begin{array}{r} 72 \\ \times 9 \\ \hline \end{array}$ B $\begin{array}{r} 86 \\ \times 8 \\ \hline \end{array}$ C $\begin{array}{r} 43 \\ \times 12 \\ \hline \end{array}$

D $\begin{array}{r} 128 \\ \times 27 \\ \hline \end{array}$ E $\begin{array}{r} 214 \\ \times 35 \\ \hline \end{array}$ F $\begin{array}{r} 436 \\ \times 124 \\ \hline \end{array}$

2. Find the quotients and remainders.

A $7\overline{)86}$ B $9\overline{)388}$ C $6\overline{)259}$

D $32\overline{)485}$ E $84\overline{)1492}$ F $69\overline{)2346}$

think

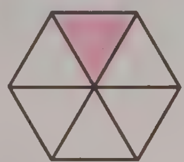
I'm the smallest number that
Will get you less than fifty
If you want to take away
From seven more than sixty.

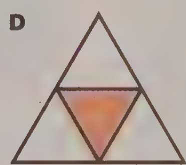
WHO AM I?

3. Which number in the set {1, 2, 3, 4, 6, 9} is **not** a factor of A 12? B 18? C 24?

4. Write a fraction that shows the part of each region that is shaded.

A

B

C

D


5. Write three more fractions in each set of equivalent fractions.

A $\{\frac{2}{3}, \frac{4}{6}, \frac{6}{9}, \ldots\}$ B $\{\frac{1}{5}, \frac{2}{10}, \frac{3}{15}, \ldots\}$ C $\{\frac{7}{10}, \frac{14}{20}, \frac{21}{30}, \ldots\}$

6. Give the lowest-terms fraction that is equivalent to each fraction.

A $\frac{5}{10}$ B $\frac{2}{8}$ C $\frac{9}{12}$ D $\frac{14}{16}$ E $\frac{75}{100}$ F $\frac{10}{15}$ G $\frac{15}{25}$

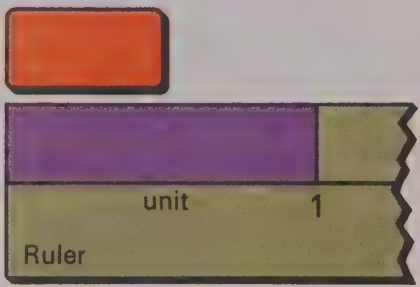
You are invited to explore

ACTIVITY CARD 16
Page 355

14 Fractional Numbers

Can fractions be used for length?

Investigating the Ideas



The fraction $\frac{1}{2}$ compares the red strip with the unit. The **length** of the red strip is **one-half** unit.

For a given unit, the length of the red strip does not change, but different fractions can be used to represent it.

? Can you find 8 fractions for the red strip when the purple strip is the unit?

These pictures may help you.

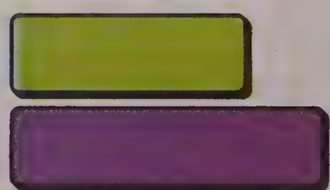
Discussing the Ideas

1. How many fractions are there that compare the red strip with the purple strip?

2. How can this statement help you understand the Investigation?

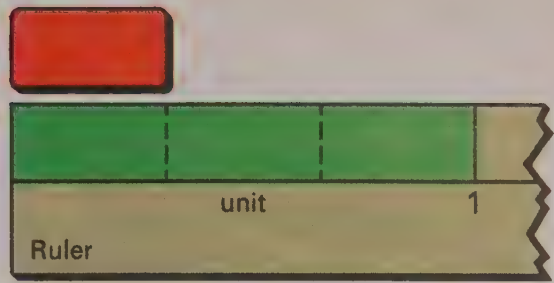
   Equivalent fractions represent the same length.

3. Can you find a set of equivalent fractions for the length of the light green strip (when the purple strip is the unit)?

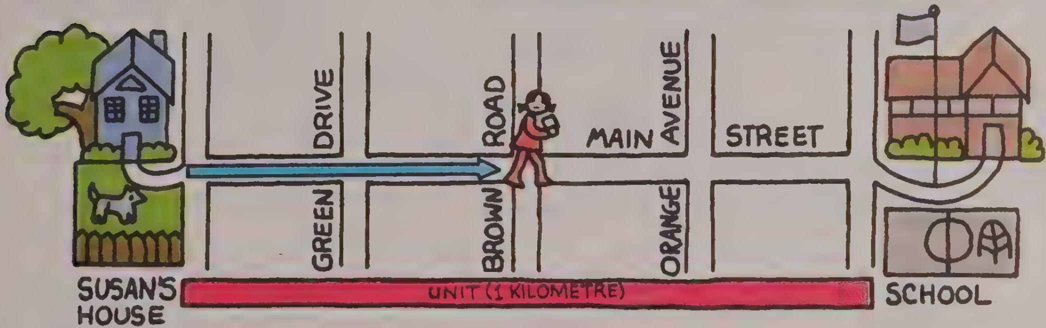


Using the Ideas

1. Give a set of equivalent fractions that tell the length of the red strip when the dark green strip is the unit.



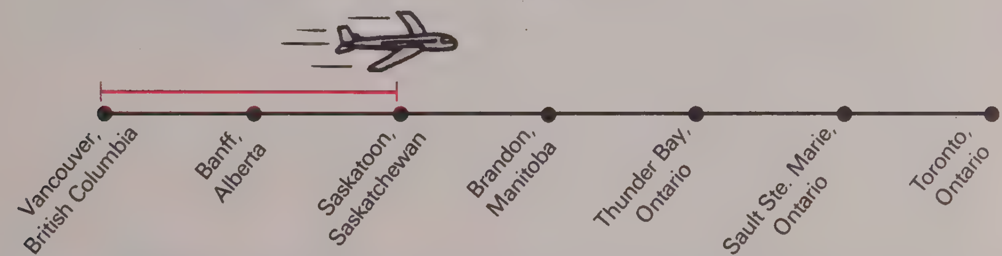
2.



A It is 1 kilometre from Susan's house to school. If the kilometre is the unit, give a fraction that tells the distance Susan has walked.

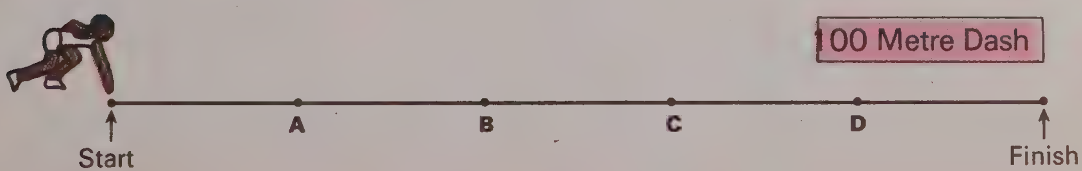
B Give another fraction for this distance.

3.



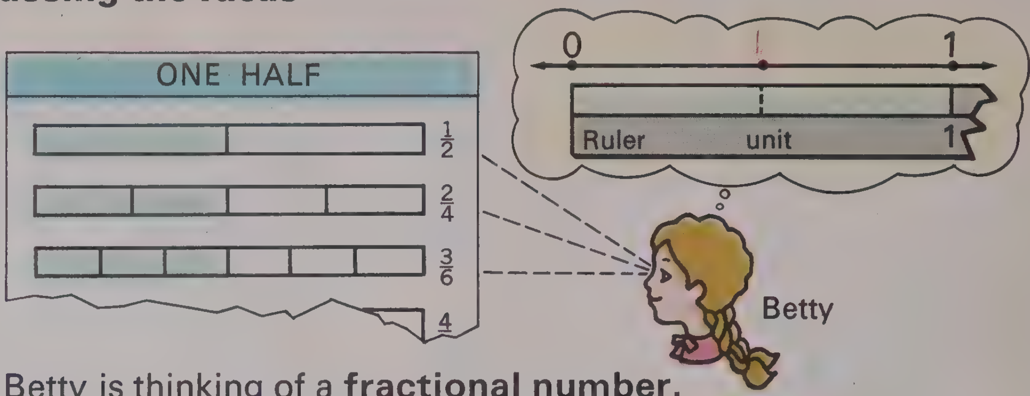
If the complete trip from Vancouver to Toronto is the unit, give two fractions that represent the distance the plane has flown.

4. Write a "fraction question" about this picture.



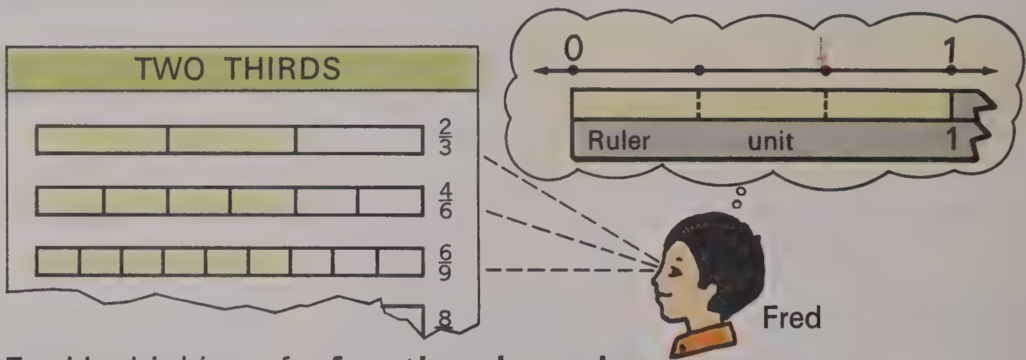
Discussing the Ideas

1.



Betty is thinking of a **fractional number.** How do you think she found the point on the number line for this number?

2.



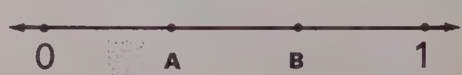
Fred is thinking of a **fractional number.** How do you think he found the point on the number line for his number?

3. For each set of equivalent fractions, we think of just one number.

We call this number a fractional number

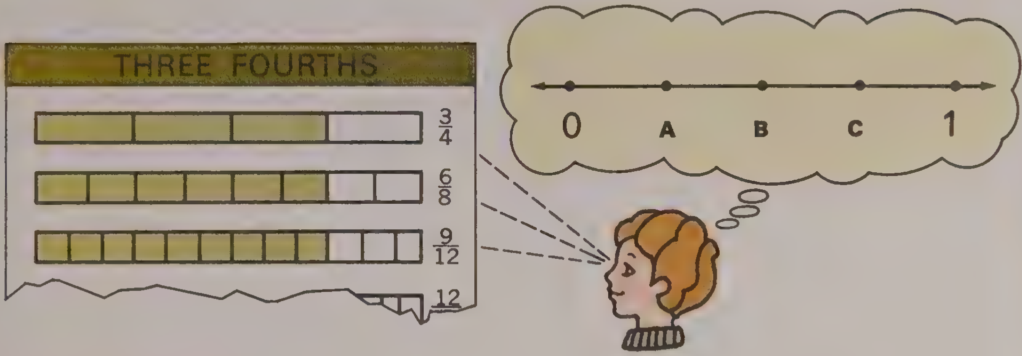
For this set of equivalent fractions, we think of **one fractional number** and **one point** on the number line. Which point? Explain.

$\{\frac{1}{3}, \frac{2}{6}, \frac{3}{9}, \frac{4}{12}, \ldots\}$



Answer A, B, or C to give the point on the number line for each set of equivalent fractions.

1.



2. $\{\frac{1}{4}, \frac{2}{8}, \frac{3}{12}, \ldots\}$

0 A B C 1

3. $\{\frac{3}{4}, \frac{6}{8}, \frac{9}{12}, \ldots\}$

0 A B C 1

4. $\{\frac{1}{5}, \frac{2}{10}, \frac{3}{15}, \ldots\}$

0 A B C 1

5. $\{\frac{4}{5}, \frac{8}{10}, \frac{12}{15}, \ldots\}$

0 A B C 1

6. $\{\frac{5}{6}, \frac{10}{12}, \frac{15}{18}, \ldots\}$

0 A B C 1

7. $\{\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \ldots\}$

0 A B C 1

8. $\{\frac{2}{5}, \frac{4}{10}, \frac{6}{15}, \ldots\}$

0 A B C 1

9. $\{\frac{1}{8}, \frac{2}{16}, \frac{3}{24}, \ldots\}$

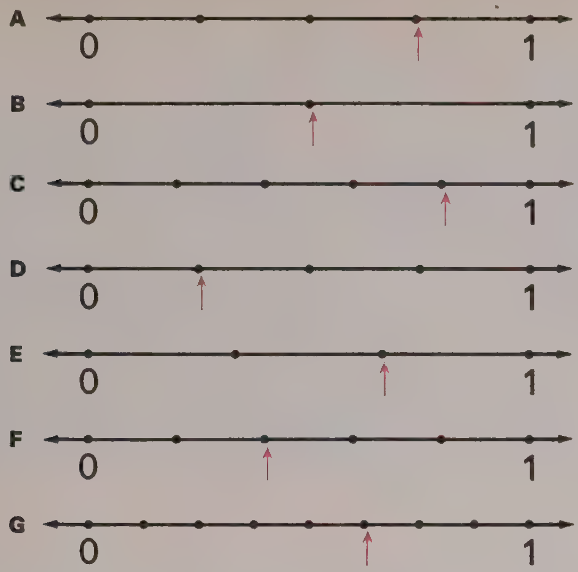
0 A B C 1

Can you match fractions with points?

For each set of equivalent fractions in the table below there is a fractional number. Give the point on the number line for that number.

Set of fractions for the number	Which point on the number line goes with the number?
1. $\{\frac{2}{5}, \frac{4}{10}, \frac{6}{15}, \frac{8}{20}, \ldots\}$	0 A B C D 1
2. $\{\frac{1}{3}, \frac{2}{6}, \frac{3}{9}, \frac{4}{12}, \ldots\}$	0 A B C 1
3. $\{\frac{2}{3}, \frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \ldots\}$	0 A B C 1
4. $\{\frac{3}{5}, \frac{6}{10}, \frac{9}{15}, \frac{12}{20}, \ldots\}$	0 A B C 1
5. $\{\frac{3}{4}, \frac{6}{8}, \frac{9}{12}, \frac{12}{16}, \ldots\}$	0 A B C 1
6. $\{\frac{4}{5}, \frac{8}{10}, \frac{12}{15}, \frac{16}{20}, \ldots\}$	0 A B C 1
7. $\{\frac{3}{7}, \frac{6}{14}, \frac{9}{21}, \frac{12}{28}, \ldots\}$	0 A B C 1
8. $\{\frac{5}{8}, \frac{10}{16}, \frac{15}{24}, \frac{20}{32}, \ldots\}$	0 A B C 1
9. $\{\frac{1}{4}, \frac{2}{8}, \frac{3}{12}, \frac{4}{16}, \ldots\}$	0 A B C 1
10. $\{\frac{1}{6}, \frac{2}{12}, \frac{3}{18}, \frac{4}{24}, \ldots\}$	0 A B C 1
11. $\{\frac{1}{3}, \frac{2}{6}, \frac{3}{9}, \frac{4}{12}, \ldots\}$	0 A B C 1

12. Match the sets of fractions with the number-line pictures.



(1) $\{\frac{4}{5}, \frac{8}{10}, \frac{12}{15}, \ldots\}$

(2) $\{\frac{2}{3}, \frac{4}{6}, \frac{6}{9}, \ldots\}$

(3) $\{\frac{3}{4}, \frac{6}{8}, \frac{9}{12}, \ldots\}$

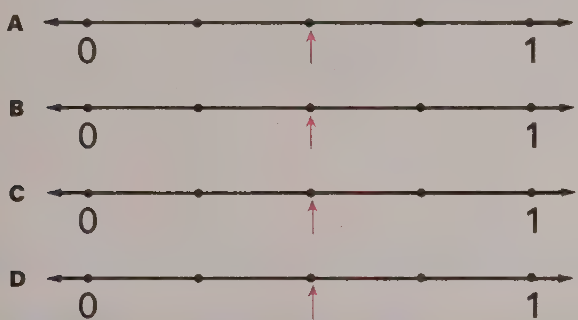
(4) $\{\frac{5}{8}, \frac{10}{16}, \frac{15}{24}, \ldots\}$

(5) $\{\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \ldots\}$

(6) $\{\frac{1}{4}, \frac{2}{8}, \frac{3}{12}, \ldots\}$

(7) $\{\frac{2}{5}, \frac{4}{10}, \frac{6}{15}, \ldots\}$

13. Choose the fraction for the point over the red arrow.



A. $\frac{6}{8}, \frac{2}{3}, \frac{1}{2}, \frac{1}{4}$

B. $\frac{1}{3}, \frac{2}{4}, \frac{5}{8}, \frac{7}{7}$

C. $\frac{5}{10}, \frac{3}{8}, \frac{1}{5}, \frac{6}{8}$

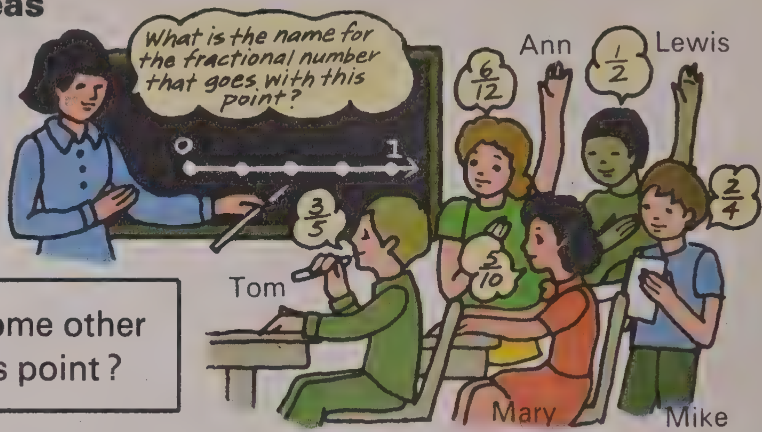
D. $\frac{4}{9}, \frac{3}{5}, \frac{8}{16}, \frac{7}{8}$

think

1. From the map, you can see that it is 2:00 in Vancouver when it is 4:00 in Winnipeg. What time is it in Montreal when it is 4:00 in Regina ?
2. When it is 7:30 in Calgary, what time is it in
   A Vancouver, B Toronto, C Winnipeg ?
3. What time zone are you in if you are eating lunch when the children in Vancouver are just starting school ?

Investigating the Ideas

Find the student who did not answer the teacher's question correctly.



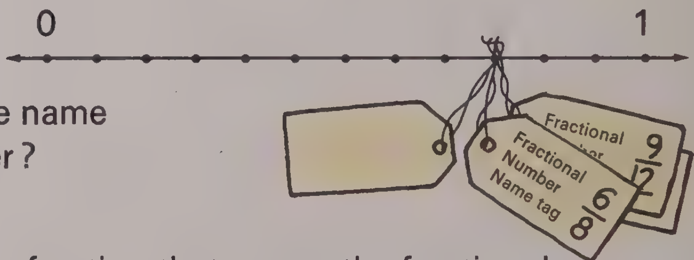
? Can you give some other fractions for this point?

Discussing the Ideas

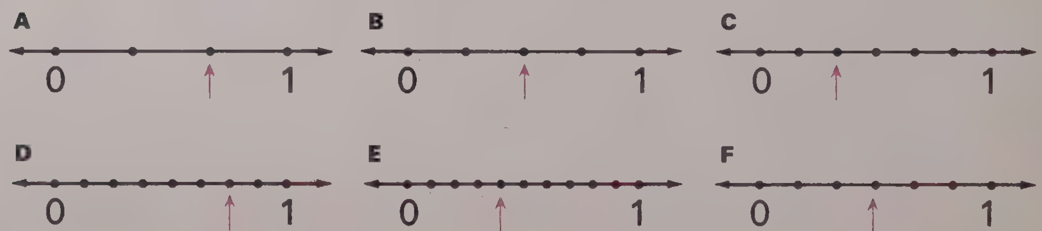
1. How can the statement below help you to find which student was wrong?

   Any fraction from a set of equivalent fractions can be used to name the fractional number for that set.

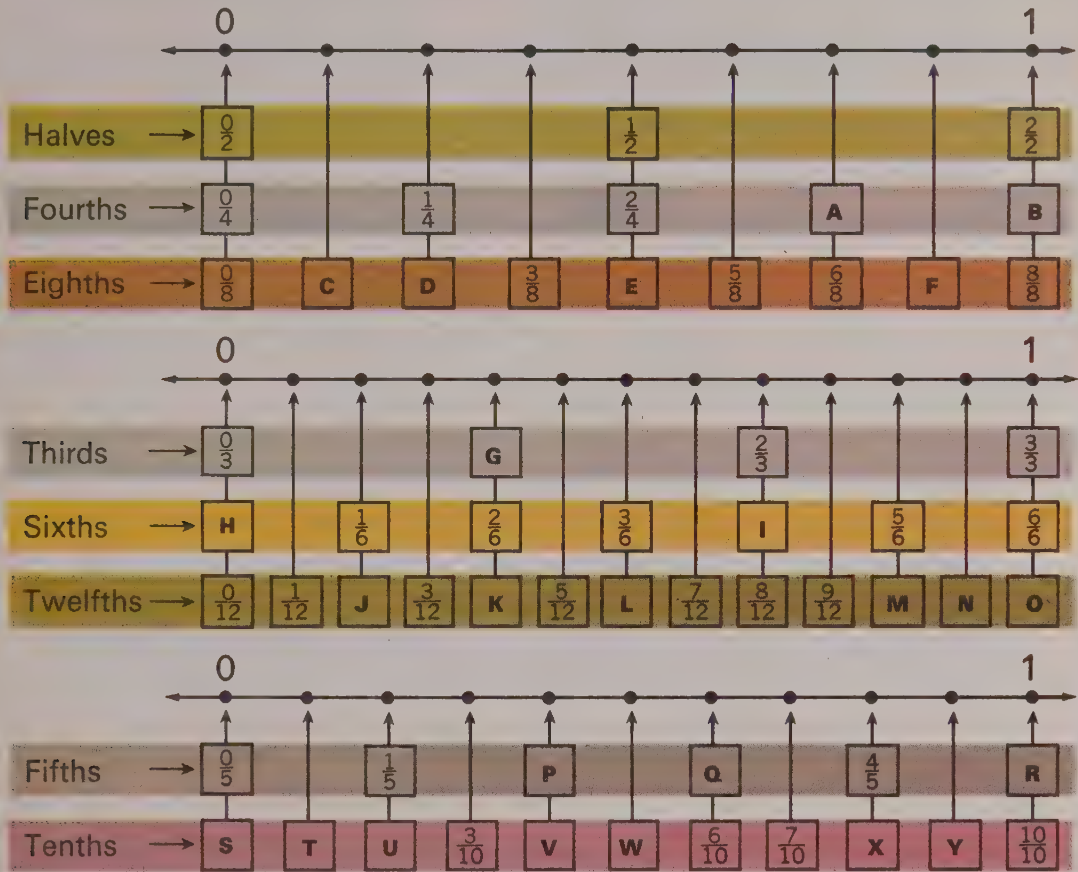
2. Although each fractional number has many names, we **usually** use the lowest-terms fraction to name the number. What do you think is on the name tag that is turned over?



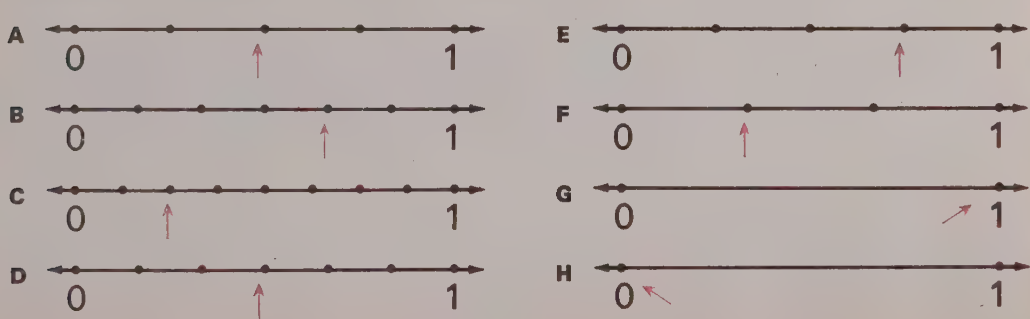
3. Give the lowest-terms fraction that names the fractional number for the point over the red arrow.



1. Just one fractional number goes with each point. Some of the fractions that name the fractional number are given. Give the missing fractions.



2. In each exercise, give two fractions to name the fractional number for the point over the red arrow.

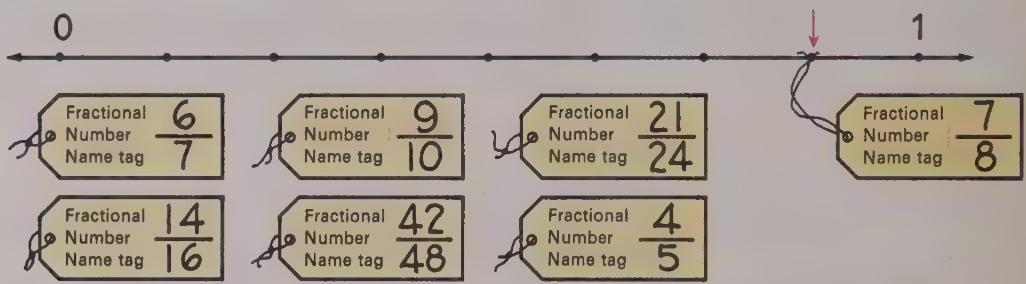


Discussing the Ideas

1.

If two fractions are equivalent, then they name the same fractional number.	If two fractions are not equivalent, then they do not name the same fractional number.

Study the statements above. Then explain which other name tags should go with the point on the number line.



2. **When we write "=" between two fractions, we mean that the two fractions name the same fractional number.**

$\frac{2}{4}$ names this fractional number $\rightarrow \{\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \ldots\}$.

$\frac{3}{6}$ names this fractional number $\rightarrow \{\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \ldots\}$.

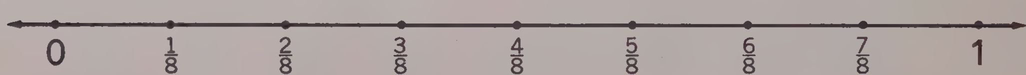
We write: $\frac{2}{4} = \frac{3}{6}$.

Study the explanation above. What equations could we write about the fractional number for the point in exercise 1 ?

3. Study this statement.

The lowest-terms fraction is the name often used for a fractional number.

How can you use this idea to relabel some of these points on the number line ?



1. In each exercise, tell whether or not the two fractions name the same fractional number.

A	$\frac{1}{2}$	$\frac{2}{4}$	C	$\frac{4}{16}$	$\frac{1}{3}$	E	$\frac{7}{10}$	$\frac{20}{30}$	G	$\frac{1}{8}$	$\frac{10}{80}$	I	$\frac{3}{10}$	$\frac{9}{20}$
B	$\frac{2}{3}$	$\frac{8}{12}$	D	$\frac{5}{8}$	$\frac{15}{24}$	F	$\frac{9}{12}$	$\frac{12}{16}$	H	$\frac{0}{8}$	$\frac{0}{7}$	J	$\frac{4}{9}$	$\frac{12}{27}$

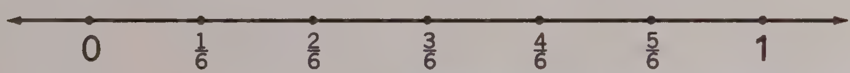
2. Give three other names for each fractional number.

A $\frac{4}{8}$ **B** $\frac{5}{6}$ **C** $\frac{1}{4}$ **D** $\frac{3}{9}$ **E** $\frac{8}{12}$ **F** $\frac{3}{10}$

3. Find the missing numerators and denominators. Think about equivalent fractions.

A	$\frac{2}{8}=\frac{\square}{4}$	E	$\frac{3}{6}=\frac{1}{\square}$	I	$\frac{5}{10}=\frac{\square}{2}$	M	$\frac{3}{12}=\frac{\square}{4}$
B	$\frac{4}{8}=\frac{1}{\square}$	F	$\frac{4}{6}=\frac{\square}{3}$	J	$\frac{6}{10}=\frac{\square}{5}$	N	$\frac{4}{12}=\frac{\square}{3}$
C	$\frac{6}{8}=\frac{\square}{4}$	G	$\frac{2}{10}=\frac{\square}{5}$	K	$\frac{8}{10}=\frac{\square}{5}$	O	$\frac{6}{12}=\frac{\square}{2}$
D	$\frac{2}{6}=\frac{1}{\square}$	H	$\frac{4}{10}=\frac{2}{\square}$	L	$\frac{2}{12}=\frac{1}{\square}$	P	$\frac{8}{12}=\frac{2}{\square}$

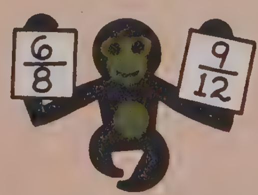
4. Give the lowest-terms fraction for each point on this number line.



5. Answer **T** (true) or **F** (false).

A	$\frac{5}{10}=\frac{1}{2}$	H	$\frac{50}{100}=\frac{1}{2}$
B	$\frac{3}{8}=\frac{9}{24}$	I	$\frac{3}{12}=\frac{1}{3}$
C	$\frac{5}{6}=\frac{5}{7}$	J	$\frac{1}{4}=\frac{10}{40}$
D	$\frac{6}{10}=\frac{3}{5}$	K	$\frac{0}{8}=\frac{1}{10}$
E	$\frac{4}{8}=\frac{20}{40}$	L	$\frac{6}{12}=\frac{2}{4}$
F	$\frac{2}{3}=\frac{8}{15}$	M	$\frac{2}{5}=\frac{6}{10}$
G	$\frac{3}{15}=\frac{1}{5}$	N	$\frac{1}{7}=\frac{3}{21}$

think



Sometimes I'm called six eighths
Nine twelfths is O.K. too.
Please give my common name,
Though any one would do.

WHO AM I?

Keeping in Touch with Addition, Subtraction, Multiplication, Division, Measurement, Inequalities

1. Which number is larger?
   A 362 807 or 359 968
   B 4 027 340 or 3 928 643
   C 78 076 or 78 100
   D 9 284 316 or 9 283 978
   E 640 000 or 98 000

2. Find the sums.
   A 3287 + 642 + 93 216 + 49
   B 43 826 + 925 + 8301 + 9640
   C 37 064 + 85 + 79 + 3246
   D 9324 + 657 + 8421 + 38

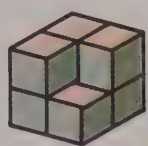
3. Find the differences.
   A 9264 − 381
   B 731 − 285
   C 6403 − 856
   D 7218 − 3451
   E 6000 − 87
   F 4006 − 198

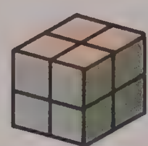
4. Find the products.
   A 37 × 26
   B 58 × 79
   C 283 × 46
   D 349 × 38

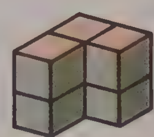
5. Find the quotients and remainders.
   A 348 ÷ 7
   B 625 ÷ 20
   ★ C 482 ÷ 36
   ★ D 1927 ÷ 51

6. Measure each segment to the nearest half centimetre.
   A
   B
   C
   D

7. Find the volume for each figure.

A 

B 

C 

You are invited to explore

ACTIVITY CARD 17
Page 355

TALL BUILDINGS

Building	Location	Height	Stories
Sears Tower	Chicago, Illinois	435 metres	110
World Trade Center	New York City	405 metres	110
Empire State	New York City	375 metres	102
John Hancock	Chicago, Illinois	332 metres	100
Chrysler	New York City	314 metres	77
Rockefeller Center	New York City	255 metres	70
Commerce Court	Toronto, Ontario	235 metres	57
Toronto-Dominion Centre	Toronto, Ontario	219 metres	55

1. How much taller is the Empire State building than the Toronto-Dominion Centre ?

2. The CN Telecommunications Tower in Toronto is over 540 metres tall. How much taller is the CN Tower than the Sears Tower ?

3. About how tall is each story in these buildings ?
   A Sears Tower
   B Empire State Building

4. A About how tall is a building if it has 58 stories and each story is about 4 metres tall ?
   B If this building has a 58-metre television tower on top, about how far is the top of the tower from the ground ?

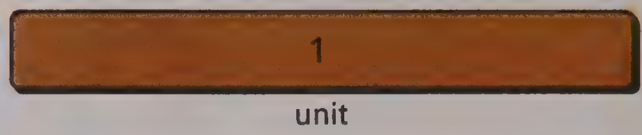
5. A radio tower on top of the Commerce Court is about 38 metres high. How far is the top of the tower from the ground ?

6. How much taller is Commerce Court than the Toronto-Dominion Centre ?

Let's explore other fractional number lengths.

Investigating the Ideas

Suppose the brown strip is the unit.



? Can you find the lowest-terms fraction for the length of each of your other strips?

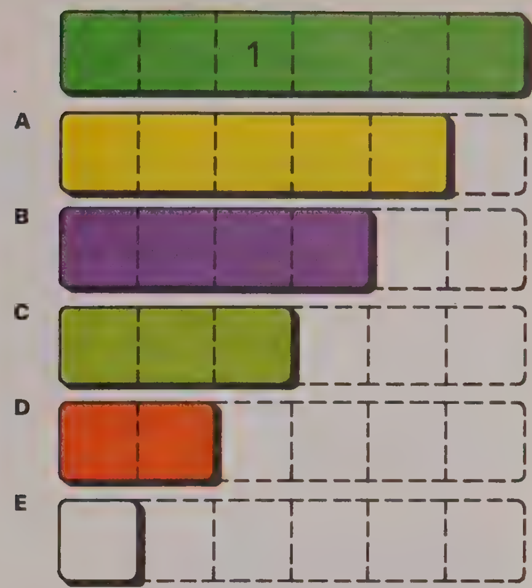
Discussing the Ideas

1. How are the fractions you found for the lengths of the blue and orange strips different from those for the other strips?

2. Can you describe more than one way to find the lowest-terms fraction for the length of the red strip?

3. Can you describe more than one way to find the lowest-terms fraction for the length of the orange strip?

1. If the dark green strip is the unit, what is the lowest-terms fraction for the length of each of the other strips?

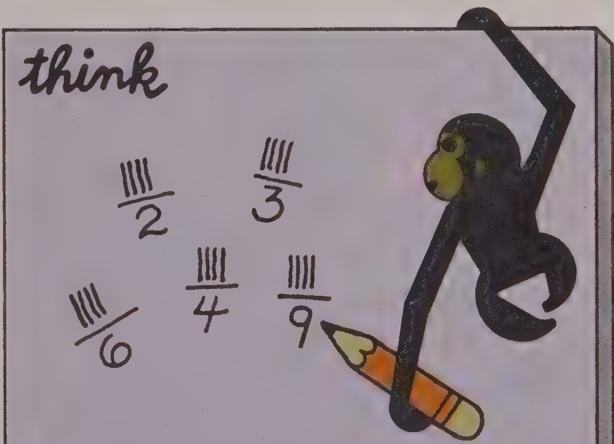


2. If the dark green strip is the unit, what is the lowest-terms fraction for the length of the blue strip? the brown strip?

3. If the orange strip is the unit, give the lowest-terms fraction for the length of each of the other strips.

4. If the yellow strip is the unit, what is the lowest-terms fraction for the length of the orange strip?

★ 5. If the purple strip is the unit, can you make a "train" of 2-strips that is $\frac{9}{2}$ units long?

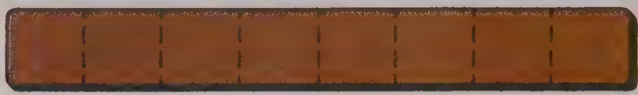


Now look at any fraction.
As long as it's my name,
No matter which you choose,
The top number is the same.

WHO AM I?

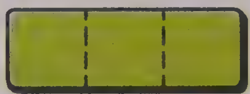
Investigating the Ideas

If the brown strip has length 1,



unit

then these strips show the **inequalities**



$\frac{3}{8} < \frac{1}{2}$ ("$\frac{3}{8}$ is less than $\frac{1}{2}$")

and

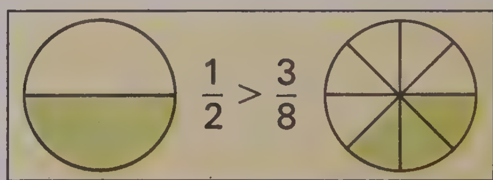
$\frac{1}{2} > \frac{3}{8}$ ("$\frac{1}{2}$ is greater than $\frac{3}{8}$")

? Using the brown strip as the unit, what other inequalities can you write and show with your strips?

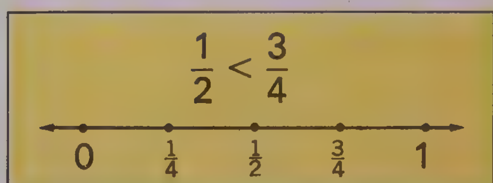
Discussing the Ideas

1. How can you tell that $\frac{3}{8}$ is less than $\frac{1}{2}$ by looking at the strips?

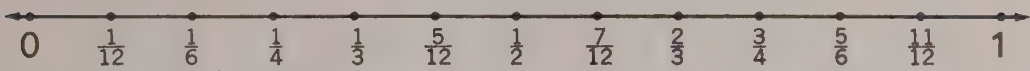
2. Explain how the shaded parts of the two circular regions help you see that $\frac{1}{2}$ is greater than $\frac{3}{8}$.



3. Explain how the number-line picture helps you see that $\frac{1}{2}$ is less than $\frac{3}{4}$.



1. Study the number line. Then give the correct sign ($<$, $=$, or $>$) for each ●.



A $\frac{1}{4}$ ● $\frac{1}{3}$ **D** $\frac{3}{4}$ ● $\frac{5}{6}$ **G** $\frac{2}{3}$ ● $\frac{3}{4}$ **J** $\frac{7}{12}$ ● $\frac{1}{2}$ **M** $\frac{2}{12}$ ● $\frac{1}{6}$

B $\frac{1}{2}$ ● $\frac{5}{12}$ **E** $\frac{7}{12}$ ● $\frac{2}{3}$ **H** $\frac{5}{6}$ ● $\frac{11}{12}$ **K** $\frac{5}{12}$ ● $\frac{1}{2}$ **N** $\frac{1}{4}$ ● $\frac{2}{12}$

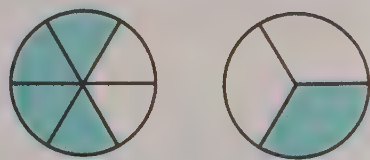
C $\frac{1}{12}$ ● $\frac{1}{4}$ **F** $\frac{1}{2}$ ● $\frac{6}{12}$ **I** $\frac{1}{12}$ ● 0 **L** $\frac{1}{2}$ ● $\frac{1}{3}$ **O** $\frac{1}{3}$ ● $\frac{3}{12}$

2. Write an inequality for each exercise.

A

Answer: $\frac{1}{4} < \frac{1}{2}$ (or $\frac{1}{2} > \frac{1}{4}$)

B



C

D

3. Answer **T** (true) or **F** (false).

A $\frac{1}{2} < \frac{5}{8}$ **G** $\frac{0}{2} = \frac{0}{8}$

B $\frac{3}{8} > \frac{2}{2}$ **H** $\frac{2}{3} = \frac{3}{4}$

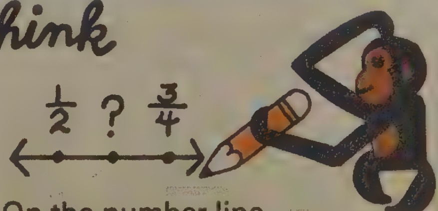
C $\frac{1}{4} < \frac{1}{8}$ **I** $\frac{4}{5} < \frac{5}{8}$

D $\frac{8}{8} = \frac{4}{4}$ **J** $\frac{3}{4} < \frac{3}{8}$

E $\frac{8}{16} > \frac{4}{8}$ ★**K** $\frac{4}{8} < \frac{4}{7}$

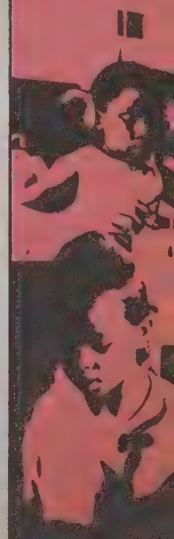
F $\frac{7}{8} < \frac{2}{2}$ ★**L** $\frac{8}{14} < \frac{8}{15}$

think



On the number line
Just look halfway between
Three-fourths and one-half.
That's where I'm often seen.

WHO AM I?



Discussing the Ideas

1. Give the missing fractions.

	0		1		2	
Halves →	$\frac{0}{2}$	$\frac{1}{2}$	$\frac{2}{2}$	$\frac{3}{2}$	A	$\frac{5}{2}$

	0			1			2	
Thirds →	$\frac{0}{3}$	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{3}{3}$	$\frac{4}{3}$	B	C	D

	0				1				2		
Fourths →	$\frac{0}{4}$	$\frac{1}{4}$	$\frac{2}{4}$	E	F	G	H	I	J	K	L

	0					1					2		
Fifths →	$\frac{0}{5}$	$\frac{1}{5}$	$\frac{2}{5}$	$\frac{3}{5}$	$\frac{4}{5}$	$\frac{5}{5}$	M	N	O	P	Q	R	S

	0						1						2			
Sixths →	$\frac{0}{6}$	$\frac{1}{6}$	T	$\frac{3}{6}$	$\frac{4}{6}$	$\frac{5}{6}$	U	$\frac{7}{6}$	$\frac{8}{6}$	$\frac{9}{6}$	V	$\frac{11}{6}$	W	$\frac{13}{6}$	X	Y

2. Choose the point for the number given.

A $\frac{7}{3}$ (Answer: *b*)

0 1 2 3 — *a*, *b*, *c*

B $\frac{12}{8}$

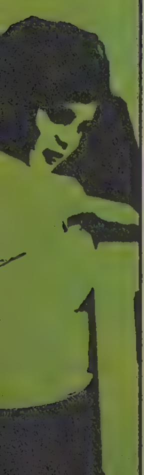
0 1 2 3 — *d*, *e*, *f*

C $\frac{16}{8}$

0 1 2 3 — *g*, *h*, *i*

D $\frac{10}{4}$

0 1 2 3 — *j*, *k*, *l*



1. Give the missing fractions.

0						1						2						3
$\frac{0}{2}$			$\frac{1}{2}$			$\frac{2}{2}$			A			B			C			$\frac{6}{2}$
D		$\frac{1}{3}$		$\frac{2}{3}$		E		$\frac{4}{3}$		F		$\frac{6}{3}$		$\frac{7}{3}$		$\frac{8}{3}$		G
$\frac{0}{6}$	H	$\frac{2}{6}$	$\frac{3}{6}$	$\frac{4}{6}$	$\frac{5}{6}$	$\frac{6}{6}$	$\frac{7}{6}$	I	$\frac{9}{6}$	$\frac{10}{6}$	$\frac{11}{6}$	J	$\frac{13}{6}$	$\frac{14}{6}$	K	$\frac{16}{6}$	L	$\frac{18}{6}$

2. Give a set of three equivalent fractions that name the fractional number for the point above the red arrow.

A


B


3. Answer **T** (true) or **F** (false).

A $\frac{2}{2} > \frac{1}{2}$

B $\frac{2}{2} < \frac{3}{2}$

C $\frac{3}{4} > \frac{3}{2}$

D $\frac{5}{2} > 2$

E $\frac{6}{8} = \frac{9}{12}$

F $\frac{5}{2} < 3$

G $\frac{6}{4} = \frac{3}{2}$

H $\frac{9}{4} < 2$

I $\frac{11}{4} > \frac{5}{2}$

J $\frac{12}{4} < 3$

K $\frac{8}{8} > \frac{4}{4}$

L $\frac{6}{3} > \frac{5}{2}$

M $\frac{0}{4} < \frac{0}{8}$

N $\frac{0}{4} > \frac{0}{8}$

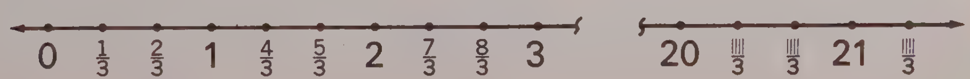
think

Study the pattern.
Then solve the equations.

$37 \times (3 \times 1) = 111$
$37 \times (3 \times 2) = 222$
$37 \times (3 \times 3) = 333$
$37 \times (3 \times 4) = 444$
$37 \times (3 \times 5) = n$
$37 \times (3 \times 8) = n$
$37 \times (3 \times 9) = n$

★ **4.** Find the missing numerators.

A


B


Investigating the Ideas

$\frac{3}{10} + \frac{5}{10} = \frac{8}{10}$

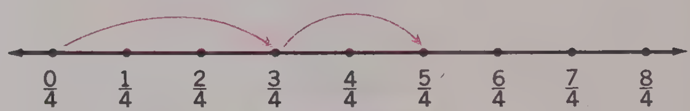
Addition Equation

? Can you use your strips to write 5 more addition equations with fractions?

Discussing the Ideas

1. What unit and which strips would you use to show that $\frac{3}{7} + \frac{2}{7} = \frac{5}{7}$? Explain.

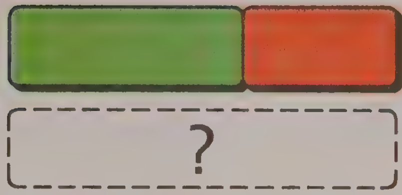
2. Explain how the number-line picture helps you find the sum of $\frac{3}{4}$ and $\frac{2}{4}$.



$\frac{3}{4} + \frac{2}{4} = n$

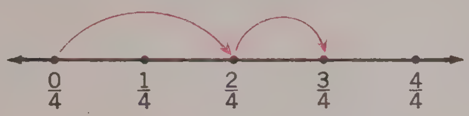
3. Explain how you would decide what the second jump would be in order to find the sum of $\frac{4}{6}$ and $\frac{5}{6}$.

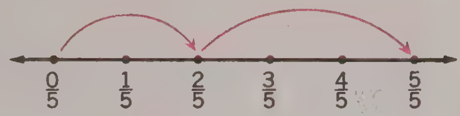
$\frac{4}{6} + \frac{5}{6} = n$

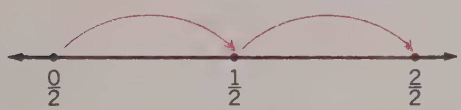


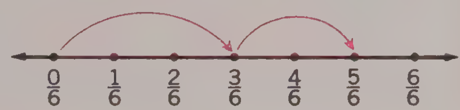
1. A If the brown strip is the unit, how long is the light green strip? the red strip?
   B What is the length of the single strip that has the same length as these two strips together?
   C Write an addition equation for this.

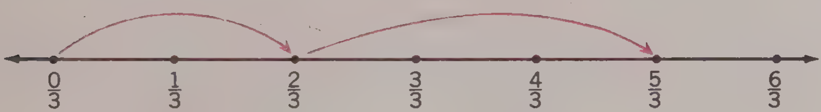
2. Write an addition equation for each number-line picture.

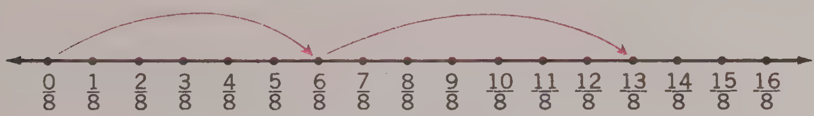
A


B


C


D


E


F


3. Find the sums.

A $\frac{3}{8}+\frac{4}{8}$	C $\frac{6}{8}+\frac{1}{8}$	E $\frac{5}{7}+\frac{4}{7}$	G $\frac{4}{10}+\frac{5}{10}$	I $\frac{5}{10}+\frac{5}{10}$
B $\frac{2}{3}+\frac{4}{3}$	D $\frac{4}{6}+\frac{4}{6}$	F $\frac{5}{6}+\frac{1}{6}$	H $\frac{9}{10}+\frac{1}{10}$	J $\frac{9}{10}+\frac{11}{10}$

★ 4. A If the red strip has length $\frac{1}{3}$ and the light green strip has length $\frac{1}{2}$, what is the unit?

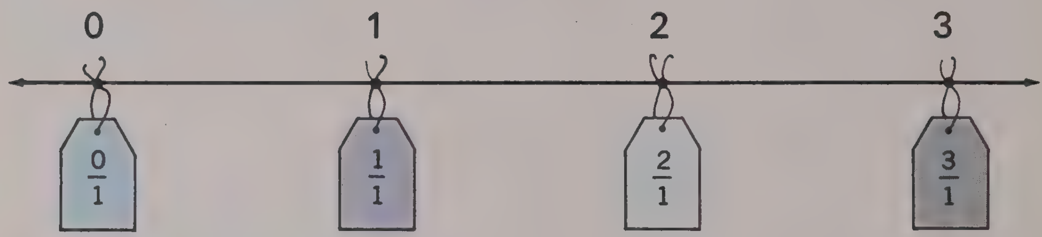
$\frac{1}{3}+\frac{1}{2}=?$

   B What is the length of the single strip that is as long as these two strips together? Copy and complete the equation.

Can whole numbers be matched with fractions?

Investigating the Ideas

This number line shows some fractional names for the whole numbers.



? Can you make a set of five different name tags for some other whole number?

Discussing the Ideas

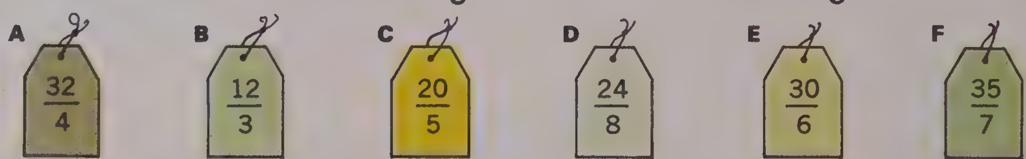
1. Explain an easy way to find the names for 0.

2. What makes it very easy to find the names for 1 ?

3. In each fraction for 2, the numerator is greater than the denominator. How many times as great ?

4. In each fraction for 3, the numerator is how many times as great as the denominator ?

5. What whole number would go with each of these tags ?



6. How could you easily find a fraction for 4 ?

1. Give the missing fractions.

0	1	2	3	4	5	6	7	8
$\frac{0}{1}$	$\frac{1}{1}$	A	$\frac{3}{1}$	$\frac{4}{1}$	$\frac{5}{1}$	B	$\frac{7}{1}$	$\frac{8}{1}$
$\frac{0}{2}$	C	$\frac{4}{2}$	D	$\frac{8}{2}$	E	$\frac{12}{2}$	F	$\frac{16}{2}$
G	$\frac{3}{3}$	$\frac{6}{3}$	$\frac{9}{3}$	H	$\frac{15}{3}$	$\frac{18}{3}$	$\frac{21}{3}$	I

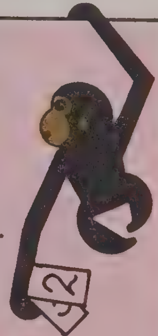
2. Match each whole number with a set of equivalent fractions.

A 3	(1) $\{\frac{9}{1}, \frac{18}{2}, \frac{27}{3}, \frac{36}{4}, \ldots\}$
B 6	(2) $\{\frac{15}{1}, \frac{30}{2}, \frac{45}{3}, \frac{60}{4}, \ldots\}$
C 1	(3) $\{\frac{6}{1}, \frac{12}{2}, \frac{18}{3}, \frac{24}{4}, \ldots\}$
D 9	(4) $\{\frac{3}{1}, \frac{6}{2}, \frac{9}{3}, \frac{12}{4}, \ldots\}$
E 0	(5) $\{\frac{1}{1}, \frac{2}{2}, \frac{3}{3}, \frac{4}{4}, \ldots\}$
F 15	(6) $\{\frac{0}{1}, \frac{0}{2}, \frac{0}{3}, \frac{0}{4}, \ldots\}$

think

2 3

I'm more than two
And less than three.
Halfway between
You will find me.



WHO AM I?

3. Give the missing numerators and denominators.

A $3 = \frac{6}{\square}$	E $0 = \frac{\square}{6}$	I $5 = \frac{15}{\square}$	M $12 = \frac{\square}{1}$	Q $\frac{1}{4} = \frac{3}{\square}$
B $6 = \frac{6}{\square}$	F $15 = \frac{30}{\square}$	J $8 = \frac{\square}{3}$	N $20 = \frac{40}{\square}$	R $\frac{1}{2} = \frac{\square}{12}$
C $1 = \frac{\square}{5}$	G $2 = \frac{\square}{4}$	K $4 = \frac{12}{\square}$	O $11 = \frac{77}{\square}$	S $\frac{2}{3} = \frac{8}{\square}$
D $9 = \frac{\square}{1}$	H $7 = \frac{\square}{2}$	L $10 = \frac{\square}{2}$	P $\frac{1}{2} = \frac{\square}{10}$	T $\frac{3}{4} = \frac{9}{\square}$

4. Find the sums.

A $\frac{4}{2} + \frac{1}{2}$	D $\frac{6}{3} + \frac{1}{3}$	G $3 + \frac{1}{3}$	J $\frac{12}{2} + \frac{3}{2}$	M $2 + \frac{3}{4}$
B $\frac{6}{2} + \frac{1}{2}$	E $2 + \frac{1}{3}$	H $\frac{12}{3} + \frac{2}{3}$	K $6 + \frac{3}{2}$	N $\frac{8}{8} + \frac{5}{8}$
C $3 + \frac{1}{2}$	F $\frac{9}{3} + \frac{1}{3}$	I $4 + \frac{2}{3}$	L $\frac{8}{4} + \frac{3}{4}$	O $1 + \frac{5}{8}$

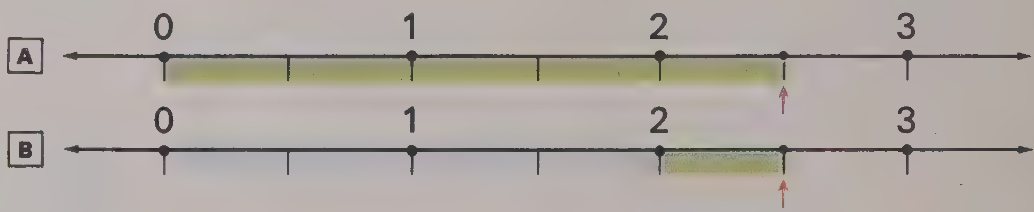
Discussing the Ideas

1. Symbols such as $2\frac{1}{2}$ and $3\frac{1}{4}$ are called mixed numerals. The two examples on the right will help you understand mixed numerals.

$2\frac{1}{2}$ means $2 + \frac{1}{2}$

$3\frac{1}{4}$ means $3 + \frac{1}{4}$

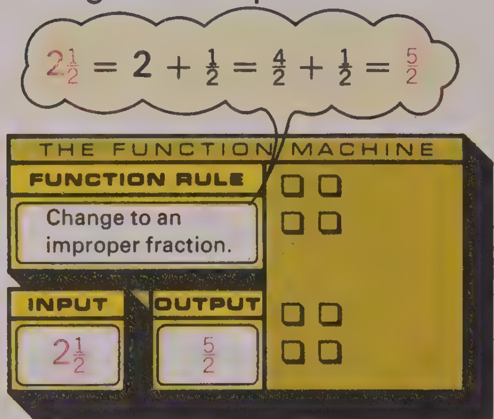
What is the meaning of $8\frac{2}{3}$? How do you think you should read the mixed numerals "$2\frac{1}{2}$," "$3\frac{1}{4}$," and "$8\frac{2}{3}$"?

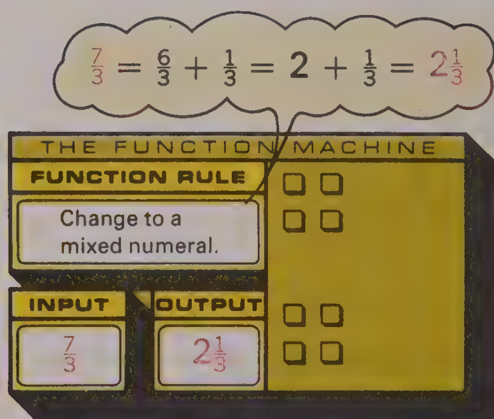
2. 

You can name the point over the red arrow with a mixed numeral or with an improper fraction. How does the colored shading in A and B show this?

3. For each mixed numeral, you can find the improper fraction. For each improper fraction, you can find the mixed numeral.

A Can you explain the way these function machines might have operated?





B Choose other "inputs" for each machine and explain how to find the "outputs."

1. Give the correct mixed numeral for each sum.

A $2 + \frac{1}{4}$
(Answer: $2\frac{1}{4}$)

B $\frac{8}{4} + \frac{1}{4}$
(Answer: $2\frac{1}{4}$)

C $3 + \frac{1}{5}$

D $\frac{15}{5} + \frac{1}{5}$

E $1 + \frac{1}{8}$

F $\frac{8}{8} + \frac{1}{8}$

G $5 + \frac{1}{2}$

H $\frac{10}{2} + \frac{1}{2}$

I $1 + \frac{5}{6}$

J $\frac{6}{6} + \frac{5}{6}$

K $1 + \frac{3}{5}$

L $\frac{5}{5} + \frac{3}{5}$

M $8 + \frac{1}{4}$

N $\frac{32}{4} + \frac{1}{4}$

O $\frac{4}{9} + \frac{6}{9}$

P $\frac{4}{9} + \frac{15}{9}$

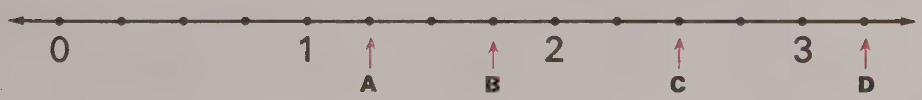
Q $\frac{6}{10} + \frac{7}{10}$

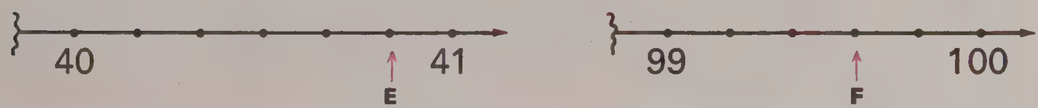
R $\frac{10}{10} + \frac{9}{10}$

2. Give a mixed numeral for each fraction. Use exercise 1.

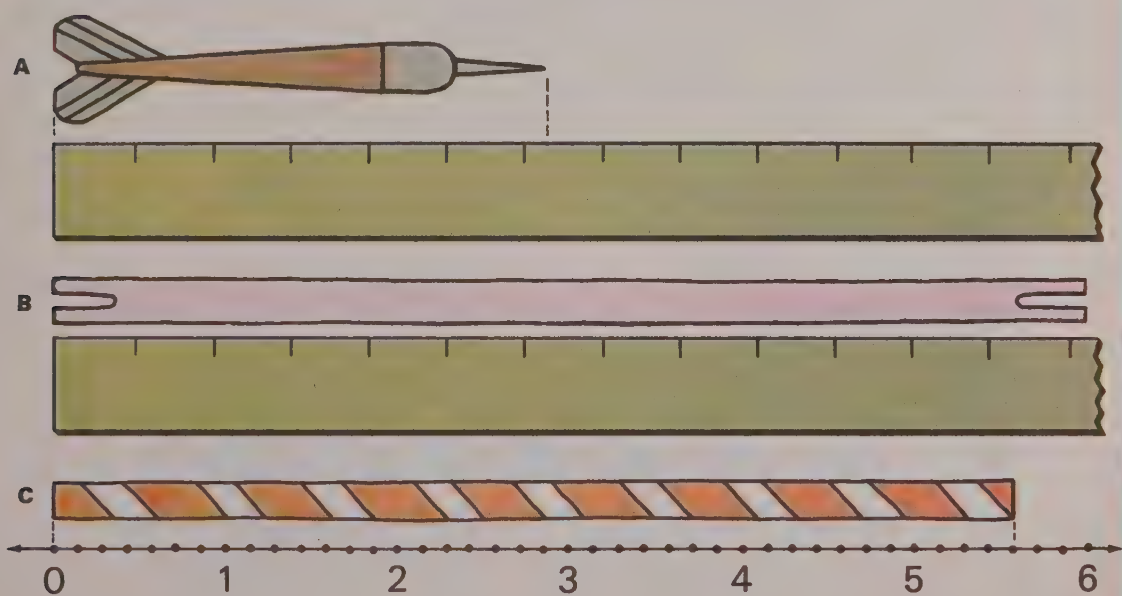
A $\frac{9}{4}$ B $\frac{16}{5}$ C $\frac{11}{6}$ D $\frac{33}{4}$ E $\frac{8}{5}$ F $\frac{9}{8}$ G $\frac{11}{2}$

3. Give a mixed numeral for each point A through F.





★ **4.** Use mixed numerals to give the length of each object.



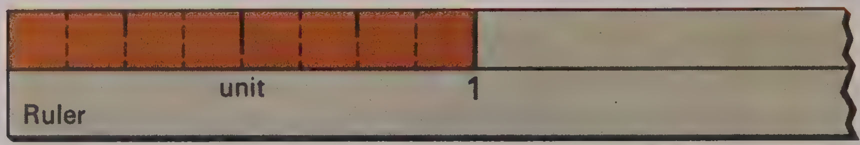
Investigating the Ideas

A $\frac{1}{2} + \frac{1}{2} = ?$

B $\frac{3}{4} + \frac{1}{4} = ?$

C $\frac{1}{4} + \frac{1}{4} = ?$

D $\frac{1}{2} + \frac{1}{4} = ?$



? Can you give a whole number or a lowest-terms fraction for each of the sums above?

Discussing the Ideas

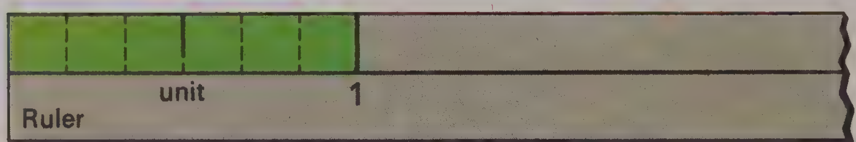
1. Can you use the sums you found above, in the order given, to help you figure out these sums?

$1\frac{1}{2} + \frac{1}{2} = ▯$, $2\frac{3}{4} + \frac{1}{4} = ▯$, $3\frac{1}{4} + 3\frac{1}{4} = ▯$, $4\frac{1}{2} + 1\frac{1}{4} = ▯$

2. A Explain how to find these two sums.

$\frac{2}{3} + \frac{1}{3} = ?$

$\frac{1}{2} + \frac{1}{3} = ?$



B Can you use the sums above to help you find these sums?

$2\frac{2}{3} + 3\frac{1}{3} = ▯$, $5\frac{1}{2} + 2\frac{1}{3} = ▯$

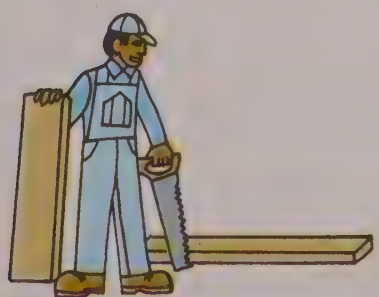
Using the Ideas

1. One Saturday, Jim had 4 lawns to mow. He mowed $2\frac{1}{2}$ lawns before lunch. How many lawns did he have left to mow in the afternoon? Solve these equations:
   A $2\frac{1}{2} + n = 4$
   B $4 - 2\frac{1}{2} = n$

2. Mrs. Brown baked 5 pies for a party. Only $3\frac{1}{3}$ pies were eaten. How many pies were left? Solve these equations:
   A $3\frac{1}{3} + n = 5$
   B $5 - 3\frac{1}{3} = n$

3. Jane lived $3\frac{1}{2}$ blocks from Sally, and Sally lived $2\frac{1}{4}$ blocks from school. If Jane walked to Sally's house and then to school, how far did she walk? Solve this equation: ⟶ $3\frac{1}{2} + 2\frac{1}{4} = n$

4. Mrs. White bought a beef roast that weighed $3\frac{1}{10}$ kilograms and a steak that weighed $2\frac{2}{5}$ kilograms. How many kilograms of meat did she buy? Solve this equation: ⟶ $3\frac{1}{10} + 2\frac{2}{5} = n$



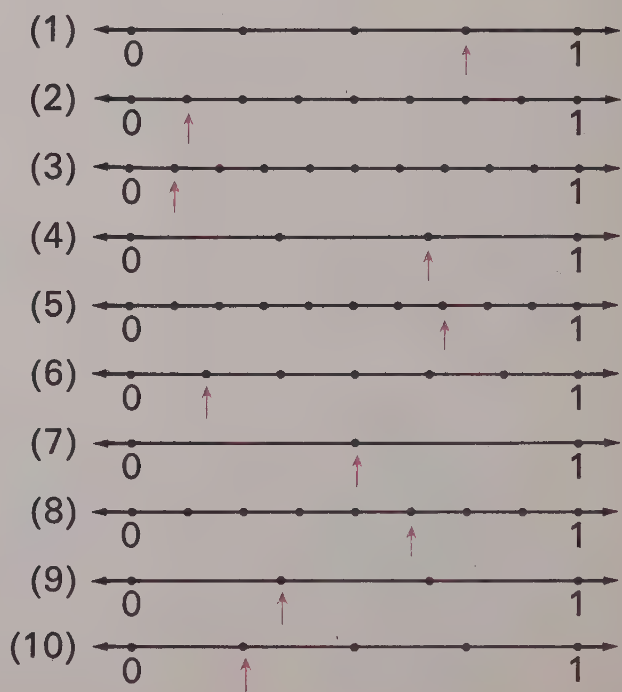
5. A carpenter cut a board into two pieces. One piece was $2\frac{3}{10}$ metres long, and the other was $1\frac{1}{5}$ metres long. How long was the board before he cut it? Solve this equation:

$$2\frac{3}{10} + 1\frac{1}{5} = n$$

Reviewing the Ideas

1. Give the missing words.
   - A For each set of equivalent fractions, there is one __?__ on the number line.
   - B For each fractional number, there is one set of __?__ fractions.
   - C For each set of equivalent fractions, we think of just one __?__ number.
   - D To name a fractional number, we can choose any __?__ from the set of equivalent fractions.
   - E The __?__ __?__ fraction is often used to name a fractional number.
   - F If two fractions are __?__, then they name the same fractional number.
   - G Each whole number is also a __?__ number.
   - H If two fractions name the same fractional number, then they are __?__.

2. Match each set of fractions with a number-line picture.
   - A $\{\frac{1}{8}, \frac{2}{16}, \frac{3}{24}, \frac{4}{32}, \ldots\}$
   - B $\{\frac{1}{3}, \frac{2}{6}, \frac{3}{9}, \frac{4}{12}, \ldots\}$
   - C $\{\frac{3}{4}, \frac{6}{8}, \frac{9}{12}, \frac{12}{16}, \ldots\}$
   - D $\{\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \ldots\}$
   - E $\{\frac{5}{8}, \frac{10}{16}, \frac{15}{24}, \frac{20}{32}, \ldots\}$
   - F $\{\frac{7}{10}, \frac{14}{20}, \frac{21}{30}, \frac{28}{40}, \ldots\}$
   - G $\{\frac{1}{4}, \frac{2}{8}, \frac{3}{12}, \frac{4}{16}, \ldots\}$
   - H $\{\frac{2}{3}, \frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \ldots\}$
   - I $\{\frac{1}{6}, \frac{2}{12}, \frac{3}{18}, \frac{4}{24}, \ldots\}$
   - J $\{\frac{1}{10}, \frac{2}{20}, \frac{3}{30}, \frac{4}{40}, \ldots\}$



3. Give the missing numerators and denominators.

A $\frac{1}{2} = \frac{5}{\square}$	D $\frac{\square}{15} = \frac{1}{5}$	G $\frac{3}{4} = \frac{30}{\square}$	J $\frac{\square}{100} = \frac{3}{10}$	M $\frac{6}{7} = \frac{\square}{14}$
B $\frac{4}{\square} = \frac{1}{3}$	E $\frac{1}{8} = \frac{\square}{40}$	H $\frac{\square}{50} = \frac{2}{5}$	K $\frac{2}{9} = \frac{\square}{36}$	N $\frac{5}{\square} = \frac{50}{80}$
C $\frac{1}{4} = \frac{\square}{40}$	F $\frac{\square}{6} = \frac{2}{3}$	I $\frac{3}{8} = \frac{\square}{24}$	L $\frac{40}{\square} = \frac{4}{5}$	O $\frac{3}{10} = \frac{\square}{50}$

4. Answer **T** (true) or **F** (false).

A $\frac{1}{2} > \frac{1}{4}$	D $\frac{5}{8} > \frac{1}{2}$	G $\frac{1}{4} < \frac{1}{3}$
B $\frac{1}{3} < \frac{1}{4}$	E $\frac{2}{3} < \frac{1}{2}$	H $\frac{4}{6} > \frac{1}{3}$
C $\frac{1}{8} < \frac{1}{4}$	F $\frac{3}{4} > \frac{1}{2}$	I $\frac{1}{6} < \frac{1}{3}$

5. Give a mixed numeral for each sum.

A $5 + \frac{1}{3}$ B $\frac{1}{4} + 2$ C $6 + \frac{1}{7}$

6. Give a lowest-terms fraction or a whole number for each sum.

A $\frac{1}{2} + \frac{1}{2}$	C $\frac{1}{4} + \frac{1}{4}$	E $\frac{1}{4} + \frac{1}{2}$
B $\frac{1}{4} + \frac{3}{4}$	D $\frac{1}{3} + \frac{2}{3}$	F $\frac{1}{3} + \frac{1}{2}$

think

Fred gave Tom $\frac{1}{2}$ of his baseball cards. Tom gave Ned $\frac{1}{2}$ of the cards he got from Fred. Ned gave Sam $\frac{1}{2}$ the cards he got from Tom. Sam got only 6 cards. How many did Fred start with?

7. Give the correct sign ($>$, $=$, or $<$) for each $\bigcirc$.

A $3 \bigcirc 3\frac{1}{4}$	C $\frac{5}{4} \bigcirc \frac{6}{4}$	E $\frac{10}{4} \bigcirc \frac{5}{2}$	G $2\frac{1}{3} \bigcirc \frac{7}{3}$
B $2\frac{7}{8} \bigcirc 3$	D $\frac{5}{4} \bigcirc \frac{5}{3}$	F $7\frac{1}{8} \bigcirc 6\frac{7}{8}$	H $\frac{10}{4} \bigcirc 2\frac{1}{2}$

8. Give the length of each segment.

A

B

Keeping in Touch with Addition, Subtraction, Multiplication, Division, Measurement

1. Find the sums and differences.

A 27 + 58	D 3427 + 96	G 5043 − 3653
B 126 − 59	E 9803 − 264	H 528 + 367 + 493
C 728 + 694	F 5043 − 217	I 6203 − 2456

2. Find the products.

A 38 × 6	C 54 × 12	E 327 × 6	G 621 × 35	I 702 × 55
B 57 × 8	D 68 × 25	F 438 × 5	H 754 × 76	J 860 × 33

3. Find the quotients and remainders.

A 36 ÷ 4	C 68 ÷ 4	E 728 ÷ 5	G 52 ÷ 13	I 726 ÷ 91
B 75 ÷ 5	D 93 ÷ 6	F 436 ÷ 9	H 148 ÷ 23	J 343 ÷ 38

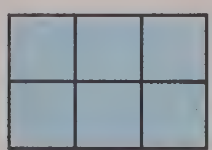
4. Find the total amounts.

A	B	C	D	E
$6.23	$13.24	$33.02	$ 31.26	$ 76.38
5.37	.67	67.00	5.48	142.50
6.43	50.83	45.28	126.50	5.78

5. Find the difference of the amounts.

A	B	C	D	E
$9.28	$62.80	$37.86	$128.16	$675.24
5.67	5.43	29.59	54.37	99.98

6. Give the area and perimeter for each figure.

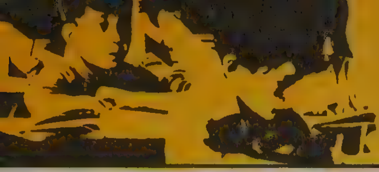
A


B


C


7. Which is more?

A 90 minutes or 2 hours	C 50 weeks or 1 year
B 3 days or 70 hours	D 1000 days or 3 years



Short Stories

1 Found 26 shells on Monday and 47 shells on Tuesday. Found how many shells?

2 Vacation. Drove 447 kilometres on first day, 379 kilometres on second day, and 526 kilometres on third day. Drove how many kilometres?

3 176 days in school year. Spend 45 cents for lunch each day. How much for lunches?

4 Had 77 cents. Spent 28 cents. Lost 7 cents. How much left?

5 Played 15 games. Won 3 more than were lost. No ties. Won how many?

6 27 cats. Twice as many kittens as grown cats. How many grown cats? How many kittens?

7 Auditorium. 35 rows of seats. 27 seats in each row. How many seats?

8 60 minutes in one hour. 24 hours in one day. 7 days in one week. How many minutes in one week?

9 Baked 93 cookies for school cookie sale. Put 5 in each bag. How many bags? How many left over?

10 Movie: $1.75. Popcorn: 35¢. Paid for brother's movie and popcorn too. Paid how much?

Airline Distances

	Toronto	Charlottetown	St. John's	Halifax	Fredericton
Montreal	537	1096	2504	1201	726
Fredericton	1267	370	1764	470	
Halifax	1740	385	1505		
St. John's	3029	1436			
Charlottetown	1639				

The airline distance between Charlottetown and Halifax is 385 kilometres.

1. Use the chart to give the airline distances between the following points.
   - A Montreal and Halifax
   - B Toronto and Fredericton
   - C Halifax and Toronto
   - D Toronto and Charlottetown
   - E Charlottetown and St. John's
   - F Montreal and St. John's
   - G Charlottetown and Fredericton
   - H St. John's and Toronto

2. How much farther is it from Montreal to St. John's than it is from Montreal to Halifax ?

3. A salesman flew from Toronto to Charlottetown, then to Halifax, and from Halifax back to Toronto. How far did he travel ?

4. If a plane takes 2 hours to fly from Montreal to Charlottetown, what is its average speed in kilometres per hour ?

5. An airliner made 7 round trips between Montreal and Toronto. How far did it fly ?

★ 6. Is it farther to go from Halifax to Montreal to Toronto than it is to go from Halifax to Toronto ?

How to Use the Activity Cards

Do you like to explore things for yourself? These Activity Cards will give you some exciting experiences with mathematics. Each card presents a different idea for you to explore. Often you will find that a card will give you ideas for additional activities on your own.

ACTIVITY CARD 1

In how many different ways can you measure yourself?

Make as many different measurements of **you** as you can and make a chart to show the information. Here are just a few suggestions:

- Pulse
- Height
- Weight
- Arm span
- Grip strength
- Length of step
- Number of calories used
- Area of bottom of foot
- Distance you can jump

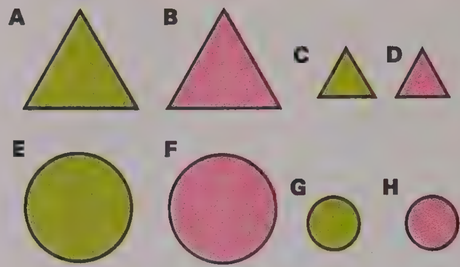
ACTIVITY CARD 2

A and **B** are different in 1 way—color.

A and **D** are different in 2 ways—color and size.

A and **F** are different in 2 ways—color and shape.

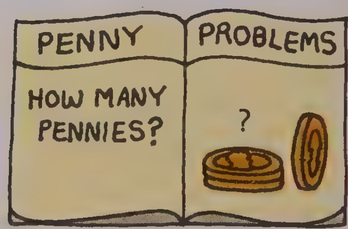
A and **H** are different in 3 ways—color, size, and shape.



Make a chart like the one shown and see how many more pairs you can fill in.

Differ in		
1 way	2 ways	3 ways
A and B	A and D	A and H
	A and F	

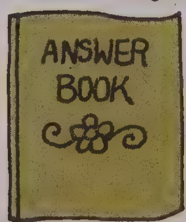
ACTIVITY CARD 3

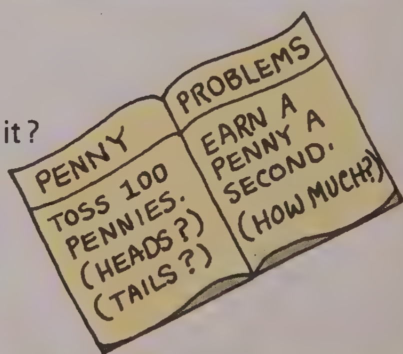


Here is a penny problem:

How many pennies does it take to make a stack of pennies as tall as a penny standing on edge? (Guess. Then get some pennies and check your guess.)

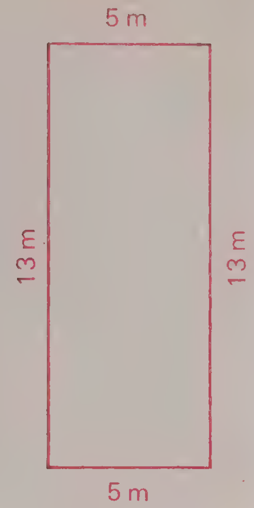
Can you make a small booklet of penny problems and an answer booklet to go with it?





ACTIVITY CARD 4

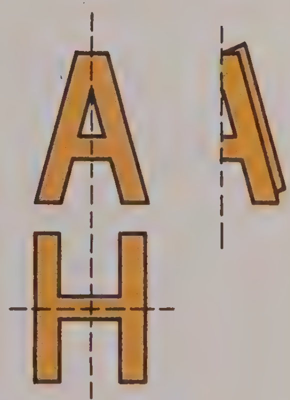
Suppose you had 36 metres of fence wire. Here is one possible pen with **4 square corners** and a **whole number of metres on each side** that you could make with the wire.



Can you draw on graph paper all the different pens of this type that you could make with the 36 metres of wire ?

ACTIVITY CARD 5

When you fold along a line of symmetry, one half exactly matches the other half.



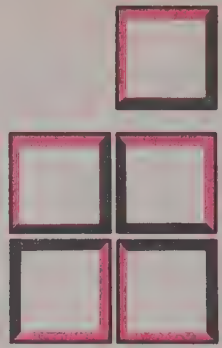
The letter **A** has 1 line of symmetry.
The letter **H** has 2 lines of symmetry.

Which letters can you cut from old newspaper headlines and show, by folding, that they

have just 1 line of symmetry ?

have exactly 2 lines of symmetry ?

ACTIVITY CARD 6



Cut out 4 squares of the same size. On each square, color two joining edges red and the other two joining edges black.

Here is one way you could place the 4 squares together to form a large square with a **symmetric pattern** (a pattern that can be folded so that one half exactly matches the other half).

How many different symmetric patterns can you make by placing the 4 squares together to form a large square? (Show each one.)

ACTIVITY CARD 7

Use 8 counters and try this game with a classmate.

At your turn, you must pick up one, two, or three counters. Then your classmate must do the same. Whoever picks up the last counter loses.

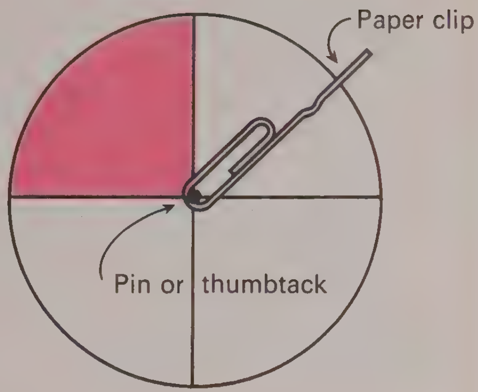
Can you work out a plan so that if you go first, you can always win?

ACTIVITY CARD 8

Make a spinner like this one.
Guess how many "reds" you will get in 10 spins. Try it.

Now guess how many "reds" you will get in 100 spins.
Make a table and record your results for 100 spins.

Can you guess how many "reds" for 1000 spins?

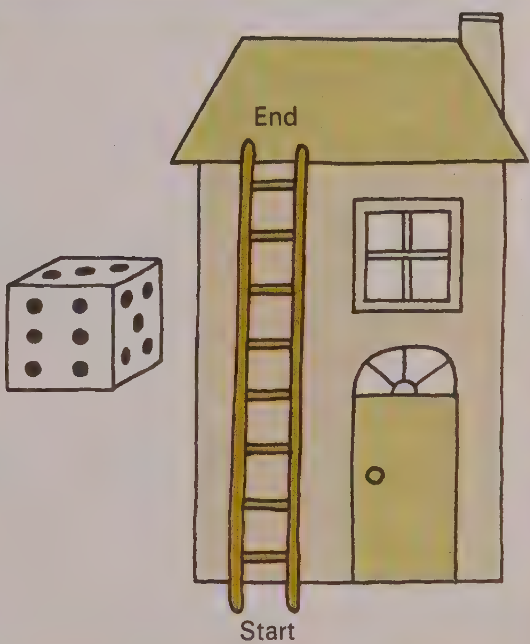


ACTIVITY CARD 9

How many tosses will it take you to climb to the roof if you follow these rules?

1. If you toss a 1 or a 6, go down one rung (if you can).
2. Go up one rung if you toss a 2, 3, 4, or 5.

Guess how many tosses.
Then use a die and try it.



ACTIVITY CARD 10

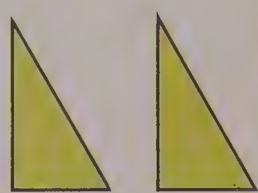
You can fold a strip of paper once and get halves.

You can fold one of the halves and get quarters.

You can fold one of the quarters and get eighths.

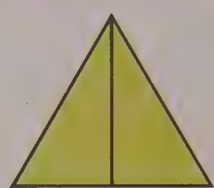
How many folds do you think it would take you to get 128ths?
Do you think you can do it? (You better use a long strip of paper.)
See how far you can go.

ACTIVITY CARD 11



Trace these two congruent right triangles, cut them out, and color them on both sides.

Here is one way a new figure can be made by placing the **same-size sides** of the two triangles together.

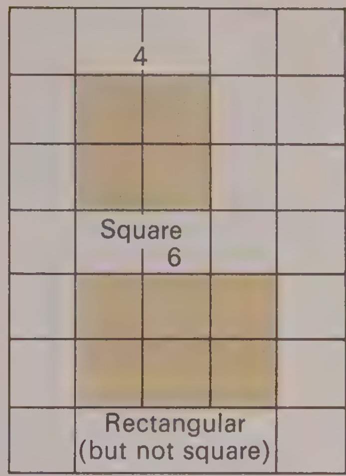


How many other different figures can you make in this way from the two triangles? (Draw and name them if you can.)

ACTIVITY CARD 12

Some numbers are square and some are rectangular but not square. Some numbers are neither square nor rectangular.

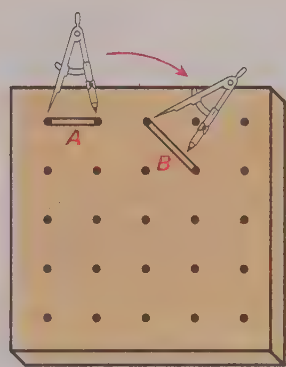
Can you color graph paper to show which numbers up to 20 are square and which are rectangular?



The rectangular numbers should have more than one row and column.

ACTIVITY CARD 13

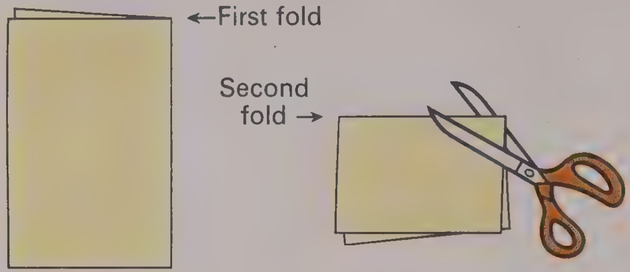
"Line segment" *B* is longer than "line segment" *A* because the nails (dots) of *B* are farther apart than the nails of *A*. (Use your compass to check this.)



How many **different lengths** of "line segments" can you find on the geoboard and draw on dot paper?

ACTIVITY CARD 14

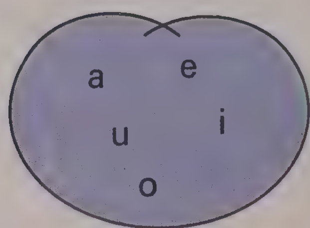
Fold a piece of paper twice and cut a piece off the corner. Then unfold the piece you cut off.



Can you cut off a piece that will unfold to be a square? a rectangle? a diamond? a four-pointed star? another interesting figure?

ACTIVITY CARD 15

Which one of these letters do you think is used most in the English language?



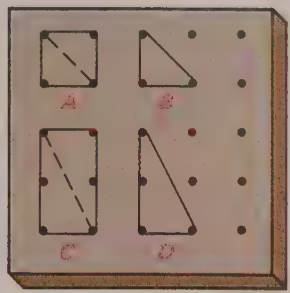
Use pages 146, 147, 203, 245, and 293 in this book to check your guess.

Make a bar graph to show your findings.

ACTIVITY CARD 16

The area of *A* is 1, so the area of triangle *B* is __ ? __.

The area of *C* is 2, so the area of triangle *D* is __ ? __.



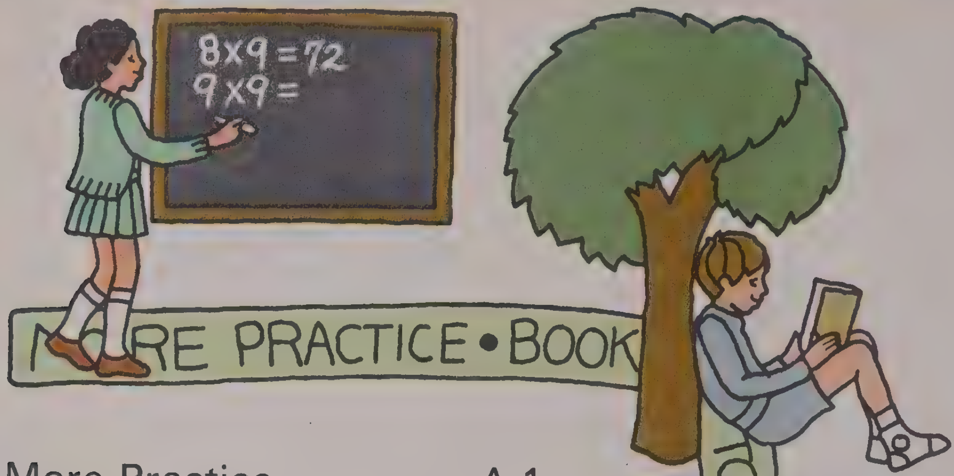
Can you find and draw on dot paper a triangle with an area of $1\frac{1}{2}$? 2? 3? 4? $4\frac{1}{2}$? 6? 8?

ACTIVITY CARD 17

Use large ruled graph paper and cut out a "5-square field" like this.

How many "5-square fields" of different shapes can you cut from your piece of graph paper?

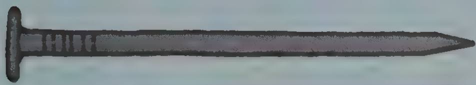
Appendix



Set 1 *For use with page 13*

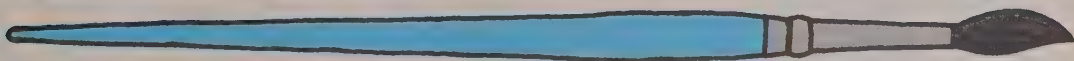
Give the length of each object to the nearest centimetre.

1. 

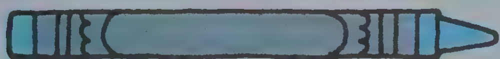
2. 

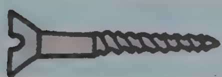
3. 

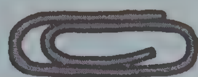
4. 

5. 

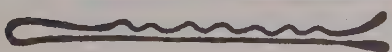
Give the length of each object to the nearest half centimetre.

6. 

7. 

8. 

9. 

10. 

Use your ruler to draw segments that have these lengths.

11. 5 centimetres

12. 13 centimetres

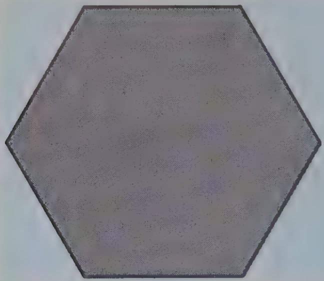
13. $10\frac{1}{2}$ centimetres

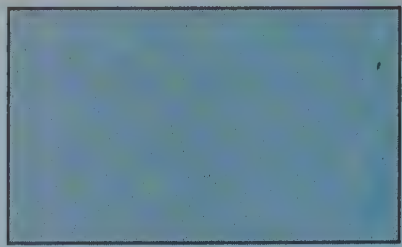
14. $5\frac{1}{2}$ centimetres

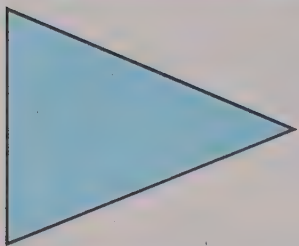
Reflected answers, Set 1: 1. 13, 2. 6, 3. 12, 6. $6\frac{1}{2}$, 7. $3\frac{1}{2}$, 8. $2\frac{1}{2}$

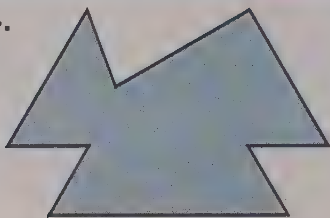
Set 2 | *For use with page 17*

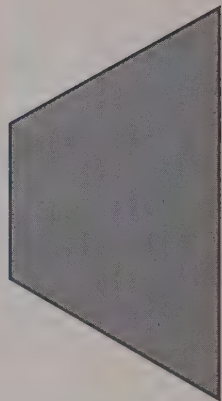
Use your centimetre ruler to find the perimeter of each figure.

1. 

2. 

3. 

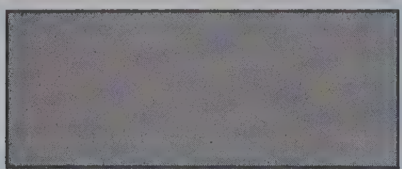
4. 

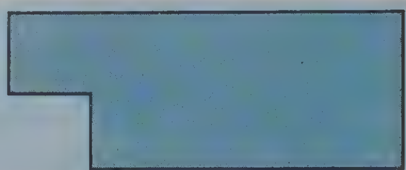
5. 

Reflected answers, Set 2: ⅃˙ 15ˎ Ƨ˙ 18

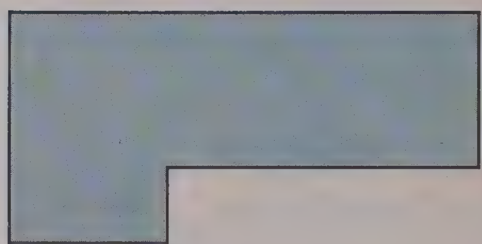
Set 3 | *For use with page 23*

Use your centimetre ruler to find the area of each region.

1. 

2. 

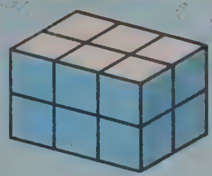
3. 

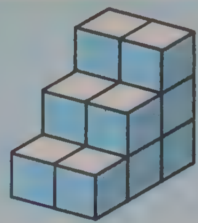
4. 

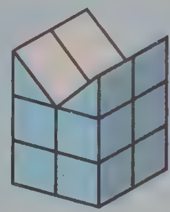
Reflected answers, Set 3: ⅃˙ 10ˎ Ƨ˙ [illegible]

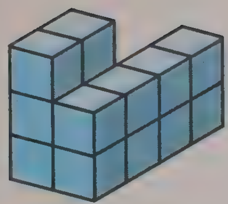
Set 4 *For use with page 27*

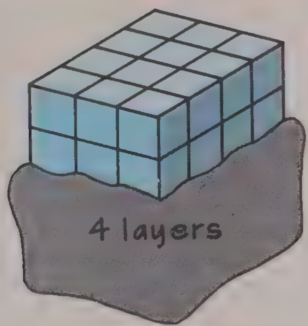
Find the volume of each figure.

1. 

2. 

3. 

4. 

5. 

6. 

Reflected answers, Set 4: 1. 12, 2. 12, 3. 10

Set 5 *For use with page 37*

Write a numeral for each exercise.

1. 8 tens and 4 ones
2. 3 tens and 6 ones
3. 2 tens and 7 ones
4. 4 hundreds, 6 tens, and 5 ones
5. 9 hundreds, 1 ten, and 8 ones
6. 7 thousands, 4 hundreds, 2 tens, and 0 ones

Give the missing digits.

7. 86 means ____ tens and ____ ones.
8. 43 means ____ tens and ____ ones.
9. 629 means ____ hundreds, ____ tens, and ____ ones.
10. 7585 means ____ thousands, ____ hundreds, ____ tens, and ____ ones.

Reflected answers, Set 5: 1. 84, 4. 465, 7. [illegible]

Set 6 *For use with page 43*

Give the missing digits in the order indicated.

1. 436 means ____ hundreds, ____ tens, and ____ ones.
2. 208 means ____ hundreds, ____ tens, and ____ ones.
3. 500 means ____ hundreds, ____ tens, and ____ ones.
4. 1639 means ____ thousands, ____ hundreds, ____ tens, and ____ ones.
5. 6072 means ____ thousands, ____ hundreds, ____ tens, and ____ ones.
6. 36 428 means ____ ten thousands, ____ thousands, ____ hundreds, ____ tens, and ____ ones.
7. 789 201 means ____ hundred thousands, ____ ten thousands, ____ thousands, ____ hundreds, ____ tens, and ____ ones.

Write the numeral for each exercise.

8. Six hundreds, eight tens, and four ones
9. Seven tens, nine hundreds, and zero ones
10. Two thousands, five hundreds, eight tens, and two ones
11. Four ten thousands, zero thousands, two hundreds, one ten, and six ones
12. Three hundred thousands, five ten thousands, eight thousands, zero hundreds, six tens, and zero ones
13. Eight hundred seventy
14. Four hundred thirty-two
15. Six thousand twenty-one

Solve the equations.

16. $139 = 100 + 30 + n$
17. $9567 = 9000 + n + 60 + 7$
18. $7124 = n + 100 + 20 + 4$
19. $64\,729 = n + 4000 + 700 + 20 + 9$
20. $283\,657 = n + 80\,000 + 3000 + 600 + 50 + 7$

Reflected answers, Set 6: 1. 4, 3, 6, 2. 2, 0, 8, 3. 5, 0, 0, 8. 684, 9. 970, 10. 2582, 16. 9, 17. 500

Set 7 *For use with page 45*

Give the correct sign (< or >) for each .

1. 640 64	11. 22 814 22 841
2. 306 360	12. 27 055 27 550
3. 4180 4108	13. 48 745 47 845
4. 7020 7200	14. 61 064 71 064
5. 4672 4762	15. 74 383 73 833
6. 98 677 97 677	16. 69 804 68 940
7. 25 340 25 430	17. 56 236 56 336
8. 49 674 49 654	18. 42 477 44 477
9. 319 487 319 847	19. 25 840 25 804
10. 560 390 506 390	20. 62 126 61 216

Reflected answers, Set 7: 1. , 2. <, 3. , 4. , 11. , 12. <, 13. >, 14. <

Set 8 *For use with page 49*

For each numeral, give the number of thousands.

1. 9804	5. 28 467	9. 381 668	13. 48 242 902
2. 5252	6. 38 773	10. 4 437 519	14. 886 106 426
3. 69 414	7. 636 532	11. 6 193 575	15. 489 870 018
4. 97 893	8. 791 313	12. 50 992 482	16. 427 322 045

Write the number the heavy black digit stands for.

17. 77 846	21. 45 966	25. 682 565	29. 481 206
18. 38 944	22. 136 972	26. 122 592	30. 121 534
19. 81 018	23. 626 490	27. 645 777	31. 906 516
20. 45 872	24. 108 774	28. 473 210	32. 628 361

Reflected answers, Set 8: 1. 9, 5. 28, 9. 381, 13. 242, 17. 7000, 21. 5000, 25. 80 000, 29. 400 000

Set 9 *For use with page 53*

Write the numeral for each part.

1. 50 more than one million
2. 300 more than six million
3. 10 thousand more than 22 967 687
4. 1 more than 3 132 679
5. 20 more than 17 778 088
6. 3 million more than 25 651 225
7. 1 thousand more than 6 000 575
8. 400 thousand more than 790 771 321
9. 60 million more than 327 966 151
10. 700 million more than 221 914 428

Reflected answers, Set 9: 1. 1 000 050, 2. 6 000 300, 3. 22 977 687

Set 10 *For use with page 61*

1. 5 empty bottles.
   6 full bottles.
   How many bottles?
2. 12 boys.
   5 wear glasses.
   How many do not wear glasses?
3. 8 puppies.
   Gave away 3.
   How many left?
4. 14 sandwiches.
   Ate 10 sandwiches.
   How many left?
5. 15 seeds.
   Planted 7.
   How many left to plant?
6. Had 3 goldfish.
   Bought 6 guppies.
   How many fish now?
7. 16 marbles.
   Lost 9.
   How many left?
8. 4 marbles needed to make a dozen in the box. How many already in the box?
9. Had 14¢. Spent 4¢.
   Lost 5¢.
   How much left?

Reflected answers, Set 10: 1. 11, 4. 4, 7. 7

Set 11 *For use with page 63*

Find the sums and differences.

1. $\begin{array}{r} 7 \\ +7 \\ \hline \end{array}$ 2. $\begin{array}{r} 14 \\ -6 \\ \hline \end{array}$ 3. $\begin{array}{r} 9 \\ +2 \\ \hline \end{array}$ 4. $\begin{array}{r} 15 \\ -9 \\ \hline \end{array}$ 5. $\begin{array}{r} 12 \\ +0 \\ \hline \end{array}$ 6. $\begin{array}{r} 4 \\ +8 \\ \hline \end{array}$ 7. $\begin{array}{r} 11 \\ -7 \\ \hline \end{array}$

8. $\begin{array}{r} 16 \\ -7 \\ \hline \end{array}$ 9. $\begin{array}{r} 8 \\ +8 \\ \hline \end{array}$ 10. $\begin{array}{r} 12 \\ -7 \\ \hline \end{array}$ 11. $\begin{array}{r} 17 \\ -9 \\ \hline \end{array}$ 12. $\begin{array}{r} 4 \\ +7 \\ \hline \end{array}$ 13. $\begin{array}{r} 3 \\ +8 \\ \hline \end{array}$ 14. $\begin{array}{r} 7 \\ +9 \\ \hline \end{array}$

Solve for ***n***.

15. $11 = n + 3$	**18.** $5 + n = 13$	**21.** $16 - n = 9$	**24.** $n + 4 = 11$
16. $7 + n = 12$	**19.** $10 - n = 6$	**22.** $13 - 5 = n$	**25.** $9 - n = 0$
17. $n + 6 = 6$	**20.** $n - 9 = 6$	**23.** $n + 5 = 14$	**26.** $4 + 8 = n$

Reflected answers, Set 11: 1. 14, 2. 8, 3. 11, 4. 6, 5. 12, 6. 12, 7. 4, 15. 8, 18. 8, 21. 7, 24. 7

Set 12 *For use with page 69*

Find the sums.

1. $\begin{array}{r} 36 \\ +45 \\ \hline \end{array}$ 2. $\begin{array}{r} 53 \\ +49 \\ \hline \end{array}$ 3. $\begin{array}{r} 67 \\ +56 \\ \hline \end{array}$ 4. $\begin{array}{r} 84 \\ +59 \\ \hline \end{array}$ 5. $\begin{array}{r} 65 \\ +86 \\ \hline \end{array}$ 6. $\begin{array}{r} 78 \\ +57 \\ \hline \end{array}$

7. $\begin{array}{r} 48 \\ 39 \\ +55 \\ \hline \end{array}$ 8. $\begin{array}{r} 36 \\ 77 \\ +65 \\ \hline \end{array}$ 9. $\begin{array}{r} 27 \\ 47 \\ +53 \\ \hline \end{array}$ 10. $\begin{array}{r} 78 \\ 33 \\ +59 \\ \hline \end{array}$ 11. $\begin{array}{r} 47 \\ 64 \\ +88 \\ \hline \end{array}$ 12. $\begin{array}{r} 34 \\ 76 \\ +95 \\ \hline \end{array}$

13. $\begin{array}{r} 73 \\ 67 \\ +96 \\ \hline \end{array}$ 14. $\begin{array}{r} 43 \\ 58 \\ +84 \\ \hline \end{array}$ 15. $\begin{array}{r} 99 \\ 84 \\ +93 \\ \hline \end{array}$ 16. $\begin{array}{r} 78 \\ 68 \\ +87 \\ \hline \end{array}$ 17. $\begin{array}{r} 87 \\ 46 \\ +97 \\ \hline \end{array}$ 18. $\begin{array}{r} 54 \\ 69 \\ +75 \\ \hline \end{array}$

Reflected answers, Set 12: 7. 142, 8. 178, 9. 127, 10. 170, 11. 199, 12. 205

Set 13	*For use with page 73*

Find the sums.

1. 426 +564	**2.** 378 +483	**3.** 507 +563	**4.** 614 +496	**5.** 834 +768	**6.** 976 +457
7. 573 +327	**8.** 538 +423	**9.** 675 +398	**10.** 417 +895	**11.** 629 +586	**12.** 879 +654

13. 4375 +2765	**14.** 4832 +6549	**15.** 5804 +3679	**16.** 3768 +5954	**17.** 6548 +7693
18. 34 785 +56 427	**19.** 53 949 +49 038	**20.** 64 838 +58 147	**21.** 85 729 +67 256	**22.** 76 617 +76 365

23. 587 46 +394	**24.** 786 497 +385	**25.** 639 417 + 63	**26.** 628 479 +853	**27.** 397 654 +836	**28.** 865 437 +942

29. 5783 4969 +3807	**30.** 8796 4357 +9438	**31.** 3468 6859 +4307	**32.** 8799 8365 +4879	**33.** 2218 3961 +9726

Solve the equations.

34. $327 + 27 + 8 = n$

35. $75 + 826 + 97 = n$

36. $486 + 43 + 8 + 7 = n$

37. $n = 59 + 39 + 3 + 41$

38. $n = 166 + 85 + 32$

39. $103 + 99 + 6 + 4 = n$

40. $591 + 54 + 37 + 2 = n$

41. $n = 47 + 363 + 62 + 5$

42. $n = 621 + 7 + 36 + 24$

43. $n = 157 + 70 + 32 + 8$

44. $528 + 30 + 93 + 4 = n$

45. $12 + 409 + 53 + 3 = n$

46. $n = 220 + 49 + 8 + 75$

47. $n = 28 + 802 + 66 + 7$

Reflected answers, Set 13: 1. 990, 2. 861, 3. 1070, 4. 1110, 5. 1602, 6. 1433, 23. 1027, 24. 1668, 25. 1119, 26. 1960, 27. 1887, 28. 2244, 34. 362, 35. 998, 41. 477, 42. 688

Set 14 *For use with page 83*

Find the differences.

1. 543 − 57	**2.** 671 − 63	**3.** 676 − 87	**4.** 847 − 50	**5.** 648 − 39	**6.** 764 − 58
7. 462 − 187	**8.** 884 − 546	**9.** 763 − 268	**10.** 846 − 457	**11.** 572 − 208	**12.** 416 − 397
13. 735 − 708	**14.** 643 − 576	**15.** 733 − 353	**16.** 454 − 328	**17.** 365 − 176	**18.** 522 − 436
19. 8742 − 967	**20.** 2606 − 812	**21.** 2388 − 394	**22.** 9438 − 6189	**23.** 9563 − 3894	**24.** 7436 − 2879

Reflected answers, Set 14: 1. 486, 2. 608, 3. 589, 4. [illegible], 5. 609, 6. [illegible], 13. [illegible], 14. 67, 15. 380, 16. 126, 17. 189, 18. 86

Set 15 *For use with page 87*

Solve each short story problem.

1. Sir Wilfrid Laurier. Born 1841. Became Prime Minister 1896. How old was he ?

2. First U.S. Satellite launched 1958. How many years ago ?

3. Alexander Graham Bell. Born 1847. Died 1922. How long ago did he live ?

4. Elizabeth I. Reigned 1558-1603. Victoria. Reigned 1837-1901. How much longer did Victoria reign ?

5. Prince Edward Island became a province in 1873. How many years ago ?

6. First human heart transplant done by Christian Barnard in 1967. How many years ago ?

Reflected answers, Set 15: 1. 55 years old, 4. 19 years

Set 16 — *For use with page 89*

Find the differences.

1. 611 −584	**2.** 840 −323	**3.** 727 −458	**4.** 450 −151	**5.** 364 −265	**6.** 436 −328
7. 7286 −6824	**8.** 4431 −3872	**9.** 7048 −5991	**10.** 8283 −7774	**11.** 5344 −3675	**12.** 6842 −5469

Reflected answers, Set 16: 1. [illegible], 2. 517, 3. 269, 4. [illegible], 5. 99, 6. 108

Set 17 — *For use with page 93*

Find the total amounts.

1. \$3.14 6.95	**2.** \$4.36 5.42	**3.** \$6.86 7.54	**4.** \$8.53 3.47	**5.** \$14.38 9.76
6. \$3.64 8.76 9.57	**7.** \$ 2.77 39.81 2.86	**8.** \$9.21 1.48 7.98	**9.** \$8.82 6.33 5.87	**10.** \$12.52 3.47 6.54

Find the differences in the amounts.

11. \$6.97 .83	**12.** \$8.65 3.86	**13.** \$9.42 .98	**14.** \$10.43 8.75	**15.** \$15.27 6.38
16. \$8.65 2.39	**17.** \$19.63 13.56	**18.** \$38.21 29.39	**19.** \$16.54 7.82	**20.** \$7.86 3.96
21. \$18.31 5.49	**22.** \$7.63 2.49	**23.** \$23.21 7.54	**24.** \$8.79 3.97	**25.** \$53.23 17.45

Reflected answers, Set 17: 1. \$10.09, 2. \$9.78, 3. [illegible], 4. [illegible],
5. \$24.14, 11. \$6.14, 12. \$4.79, 13. \$8.44, 14. \$1.68, 15. \$8.89

Set 18 — *For use with page 119*

Solve the equations.

1. $5 + 5 + 5 + 5 = n$	8. $6 + 6 + 6 + 6 + 6 = n$
2. $4 \times 5 = n$	9. $5 \times 6 = n$
3. $20 - 5 = n$	10. $30 - 6 = n$
4. $15 - 5 = n$	11. $24 - 6 = n$
5. $10 - 5 = n$	12. $18 - 6 = n$
6. $5 - 5 = n$	13. $12 - 6 = n$
7. $20 \div 5 = n$	14. $6 - 6 = n$
	15. $30 \div 6 = n$

Reflected answers, Set 18: 1. 20, 2. 20, 8. 30, 9. 30

Set 19 — *For use with page 129*

Find the products.

1. 2×4	16. 1×6	31. 3×9	46. 9×2	61. 6×7	76. 5×1
2. 1×9	17. 8×3	32. 7×5	47. 0×0	62. 4×6	77. 1×8
3. 3×3	18. 7×1	33. 9×6	48. 0×8	63. 2×5	78. 2×6
4. 7×2	19. 6×9	34. 8×1	49. 3×7	64. 4×2	79. 6×5
5. 5×5	20. 2×2	35. 5×9	50. 1×7	65. 8×4	80. 3×1
6. 0×3	21. 2×8	36. 4×8	51. 6×2	66. 7×3	81. 1×3
7. 4×5	22. 4×3	37. 2×1	52. 7×0	67. 9×5	82. 6×1
8. 1×4	23. 2×7	38. 7×8	53. 9×3	68. 9×9	83. 5×2
9. 9×7	24. 3×6	39. 8×9	54. 4×1	69. 2×3	84. 8×8
10. 7×4	25. 3×8	40. 8×2	55. 5×0	70. 9×8	85. 8×5
11. 6×3	26. 9×1	41. 3×5	56. 8×7	71. 4×0	86. 9×4
12. 5×8	27. 1×2	42. 5×6	57. 1×5	72. 4×9	87. 7×9
13. 7×7	28. 2×9	43. 7×6	58. 3×2	73. 6×6	88. 3×4
14. 6×8	29. 4×4	44. 5×4	59. 9×0	74. 6×4	89. 5×3
15. 5×7	30. 4×7	45. 9×6	60. 1×1	75. 0×1	90. 6×0

Reflected answers, Set 19: 1. 8, 2. 9, 16. 6, 17. 24, 31. 27, 32. 35, 46. 18, 47. 0, 61. 42, 62. 24, 76. 5, 77. 8

Set 20 *For use with page 132*

Solve each short story problem.

1. Chorus frog: 5 centimetres long. Bullfrog: 3 times as long. How long ?
2. Field mouse: 15 centimetres. Beaver: 5 times as long. How long ?
3. 7 kilometres to Albany. 9 times as far to Mumford. How far to Mumford ?
4. Joe: 4 blocks from school. Jack: 4 times as far. How far ?
5. Dan: 9 years old. Tom: twice as old. How old ?
6. Dolphin: 6 metres long. Killer whale: 3 times as long. How long ?

Reflected answers, Set 20: 1. 15 cm, 4. 16 blocks

Set 21 *For use with page 135*

Solve the equations.

1. $7 \times n = 49$
2. $49 \div 7 = n$
3. $3 \times n = 18$
4. $18 \div 3 = n$
5. $8 \times n = 48$
6. $48 \div 8 = n$
7. $n \times 5 = 45$
8. $45 \div 5 = n$
9. $n \times 4 = 20$
10. $20 \div n = 4$
11. $n \times 8 = 64$
12. $64 \div 8 = n$
13. $3 \times n = 24$
14. $24 \div n = 3$
15. $7 \times n = 42$
16. $42 \div 7 = n$
17. $n \times 5 = 15$
18. $15 \div 5 = n$
19. $n \times 9 = 63$
20. $63 \div 9 = n$
21. $n \times 2 = 14$
22. $14 \div 2 = n$
23. $n \times 7 = 35$
24. $35 \div 7 = n$
25. $n \times 5 = 40$
26. $40 \div 5 = n$
27. $n \times 7 = 21$
28. $21 \div n = 7$
29. $n \times 5 = 10$
30. $10 \div 5 = n$
31. $n \times 3 = 12$
32. $12 \div 3 = n$
33. $n \times 4 = 28$
34. $28 \div 4 = n$
35. $n \times 8 = 72$
36. $72 \div 8 = n$

15. 6, 16. 6, 25. 8, 26. 8, 27. 3, 28. 3
Reflected answers, Set 21: 1. 7, 2. 7, 3. 6, 4. 6, 13. 8, 14. 8,

Set 22 *For use with page 137*

1. 5 ÷ 1	**18.** 10 ÷ 5	**35.** 30 ÷ 5	**52.** 5 ÷ 5	**69.** 18 ÷ 6
2. 21 ÷ 7	**19.** 28 ÷ 4	**36.** 24 ÷ 3	**53.** 49 ÷ 7	**70.** 27 ÷ 9
3. 2 ÷ 1	**20.** 6 ÷ 3	**37.** 8 ÷ 4	**54.** 36 ÷ 9	**71.** 0 ÷ 5
4. 40 ÷ 8	**21.** 16 ÷ 2	**38.** 54 ÷ 6	**55.** 56 ÷ 7	**72.** 4 ÷ 1
5. 18 ÷ 3	**22.** 24 ÷ 6	**39.** 6 ÷ 2	**56.** 2 ÷ 2	**73.** 7 ÷ 7
6. 72 ÷ 8	**23.** 35 ÷ 7	**40.** 6 ÷ 6	**57.** 32 ÷ 4	**74.** 14 ÷ 2
7. 42 ÷ 7	**24.** 54 ÷ 9	**41.** 3 ÷ 1	**58.** 15 ÷ 3	**75.** 25 ÷ 5
8. 12 ÷ 4	**25.** 30 ÷ 6	**42.** 15 ÷ 5	**59.** 64 ÷ 8	**76.** 18 ÷ 2
9. 9 ÷ 1	**26.** 35 ÷ 5	**43.** 24 ÷ 8	**60.** 24 ÷ 4	**77.** 10 ÷ 2
10. 12 ÷ 3	**27.** 4 ÷ 2	**44.** 81 ÷ 9	**61.** 72 ÷ 9	**78.** 12 ÷ 6
11. 8 ÷ 1	**28.** 40 ÷ 5	**45.** 4 ÷ 4	**62.** 0 ÷ 9	**79.** 28 ÷ 7
12. 48 ÷ 8	**29.** 0 ÷ 1	**46.** 20 ÷ 5	**63.** 1 ÷ 1	**80.** 9 ÷ 9
13. 45 ÷ 5	**30.** 7 ÷ 1	**47.** 16 ÷ 8	**64.** 45 ÷ 9	**81.** 63 ÷ 7
14. 32 ÷ 8	**31.** 48 ÷ 6	**48.** 3 ÷ 3	**65.** 8 ÷ 2	**82.** 42 ÷ 6
15. 8 ÷ 8	**32.** 21 ÷ 3	**49.** 20 ÷ 4	**66.** 9 ÷ 3	**83.** 56 ÷ 8
16. 16 ÷ 4	**33.** 27 ÷ 3	**50.** 36 ÷ 4	**67.** 63 ÷ 9	**84.** 36 ÷ 6
17. 14 ÷ 7	**34.** 12 ÷ 2	**51.** 6 ÷ 1	**68.** 18 ÷ 9	**85.** 20 ÷ 4

Reflected answers, Set 22: 1. 5, 2. 3, 3. 2, 18. 2, 19. 7, 20. 2, 35. 6, 36. 8, 37. 2, 52. 1, 53. 7, 54. 4, 69. 3, 70. 3, 71. 0

Set 23 *For use with page 141*

Solve each story problem.

1. 7 boys. 3 sandwiches for each boy. How many sandwiches?
2. 40 Boy Scouts. 8 in each patrol. How many patrols?
3. 7 pies. 6 pieces per pie. How many pieces of pie?
4. 8 donuts per box. 8 boxes. How many donuts?
5. 9 teams. 5 players on each team. How many players?
6. 54 pieces of candy. 9 children. How many pieces per child?

Reflected answers, Set 23: 1. 21, 2. 5, 3. 42

Set 24 *For use with page 159*

Find the products.

1. 5 × 40	**8.** 8 × 300	**15.** 9 × 60	**22.** 3 × 700	**29.** 6 × 70
2. 8 × 60	**9.** 50 × 9	**16.** 800 × 7	**23.** 6 × 900	**30.** 70 × 9
3. 4 × 70	**10.** 6 × 800	**17.** 7 × 50	**24.** 5 × 900	**31.** 70 × 8
4. 8 × 90	**11.** 700 × 7	**18.** 600 × 7	**25.** 9 × 90	**32.** 600 × 6
5. 40 × 8	**12.** 5 × 50	**19.** 9 × 30	**26.** 4 × 400	**33.** 4 × 300
6. 20 × 9	**13.** 300 × 5	**20.** 70 × 7	**27.** 6 × 500	**34.** 800 × 8
7. 80 × 5	**14.** 2 × 70	**21.** 8 × 200	**28.** 900 × 3	**35.** 700 × 4

Solve each short story problem.

36. 9 fields.
700 plants per field.
How many plants?

37. 8 pages.
300 words per page.
How many words?

Reflected answers, Set 24: 1. 200, 2. 480, 8. 2400, 9. 450, 15. 540, 16. 5600, 22. 2100, 23. 5400, 29. 420, 30. 630

Set 25 *For use with page 161*

Solve the equations.

1. $n \times 5 = 250$	**10.** $n \times 4 = 1200$	**19.** $n \times 200 = 1000$
2. $n \times 5 = 2500$	**11.** $n \times 7 = 490$	**20.** $n \times 70 = 420$
3. $n \times 6 = 480$	**12.** $n \times 3 = 900$	**21.** $n \times 8 = 3200$
4. $n \times 6 = 4800$	**13.** $n \times 8 = 720$	**22.** $n \times 600 = 1200$
5. $n \times 3 = 150$	**14.** $n \times 5 = 4000$	**23.** $n \times 9 = 540$
6. $n \times 3 = 1500$	**15.** $n \times 6 = 3600$	**24.** $n \times 400 = 2800$
7. $n \times 4 = 160$	**16.** $n \times 5 = 4500$	**25.** $n \times 50 = 300$
8. $n \times 9 = 3600$	**17.** $n \times 20 = 180$	**26.** $n \times 70 = 560$
9. $n \times 3 = 270$	**18.** $n \times 70 = 350$	**27.** $n \times 300 = 2100$

Reflected answers, Set 25: 1. 50, 2. 500, 10. 300, 11. 70, 19. 5, 20. 6

Set 26 *For use with page 163*

Find the quotients.

1. 160 ÷ 4	**4.** 360 ÷ 4	**7.** 90 ÷ 3	**10.** 140 ÷ 7	**13.** 180 ÷ 60
2. 270 ÷ 3	**5.** 200 ÷ 4	**8.** 180 ÷ 9	**11.** 360 ÷ 6	**14.** 270 ÷ 90
3. 210 ÷ 3	**6.** 630 ÷ 9	**9.** 120 ÷ 2	**12.** 560 ÷ 8	**15.** 140 ÷ 20

Find the quotients.

16. $5\overline{)250}$	**19.** $6\overline{)120}$	**22.** $6\overline{)420}$	**25.** $90\overline{)720}$	**28.** $30\overline{)150}$
17. $2\overline{)180}$	**20.** $7\overline{)280}$	**23.** $2\overline{)140}$	**26.** $40\overline{)240}$	**29.** $40\overline{)320}$
18. $2\overline{)100}$	**21.** $7\overline{)630}$	**24.** $90\overline{)450}$	**27.** $8\overline{)640}$	**30.** $70\overline{)560}$

Solve each short story problem.

31. 360 apples.
9 boxes. How many
apples in each box?

32. 490 bricks.
70 bricks in each layer.
How many layers?

Reflected answers, Set 26: 1. 40, 4. 90, 7. 30, 10. 20, 13. 3, 16. 50, 19. 20, 22. 70, 25. 8, 28. 5

Set 27 *For use with page 165*

Find the products.

1. 50 × 50	**4.** 40 × 20	**7.** 50 × 30	**10.** 50 × 400	**13.** 20 × 200
2. 60 × 50	**5.** 60 × 90	**8.** 40 × 80	**11.** 80 × 200	**14.** 70 × 500
3. 30 × 80	**6.** 20 × 30	**9.** 90 × 90	**12.** 60 × 800	**15.** 40 × 600

Find the quotients.

16. $50\overline{)4000}$	**19.** $60\overline{)2400}$	**22.** $40\overline{)2800}$	**25.** $50\overline{)4500}$	**28.** $40\overline{)1200}$
17. $90\overline{)5400}$	**20.** $20\overline{)1600}$	**23.** $50\overline{)1000}$	**26.** $80\overline{)4800}$	**29.** $70\overline{)4200}$
18. $70\overline{)3500}$	**21.** $30\overline{)600}$	**24.** $80\overline{)3200}$	**27.** $30\overline{)1200}$	**30.** $80\overline{)7200}$

Reflected answers, Set 27: 1. 2500, 4. 800, 7. 1500, 10. 20 000, 13. 4000, 16. 80, 19. 40, 22. 70, 25. 90, 28. 30

Set 28 *For use with page 175*

Estimate each product.

1. 41 × 8	**6.** 58 × 4	**11.** 76 × 71	**16.** 92 × 58	**21.** 684 × 6
2. 52 × 7	**7.** 33 × 7	**12.** 19 × 93	**17.** 77 × 83	**22.** 816 × 5
3. 93 × 5	**8.** 22 × 3	**13.** 83 × 52	**18.** 47 × 33	**23.** 698 × 3
4. 67 × 4	**9.** 38 × 5	**14.** 69 × 56	**19.** 28 × 82	**24.** 4 × 933
5. 54 × 2	**10.** 8 × 91	**15.** 82 × 29	**20.** 54 × 56	**25.** 7 × 519

Estimate each answer.

26. 12 eggs make 1 dozen.
How many eggs in 8 dozen ?

27. 52 weeks in 1 year.
How many weeks in 6 years ?

28. 16 children in 1 bus.
How many children in 14 buses ?

29. Pens: 89¢ each.
How much for 28 pens ?

Reflected answers, Set 28: 1. 320, 2. 350, 6. 240, 7. 210, 11. 5600, 12. 1800, 16. 5400, 17. 6400, 21. 4200, 22. 4000

Set 29 *For use with page 177*

Estimate each quotient.

1. $4\overline{)78}$	**5.** $9\overline{)736}$	**9.** $6\overline{)562}$	**13.** $7\overline{)5010}$	**17.** $89\overline{)277}$
2. $3\overline{)291}$	**6.** $8\overline{)571}$	**10.** $8\overline{)639}$	**14.** $9\overline{)2180}$	**18.** $62\overline{)490}$
3. $6\overline{)431}$	**7.** $4\overline{)296}$	**11.** $3\overline{)164}$	**15.** $2\overline{)1750}$	**19.** $53\overline{)608}$
4. $5\overline{)347}$	**8.** $7\overline{)643}$	**12.** $5\overline{)396}$	**16.** $4\overline{)3190}$	**20.** $38\overline{)157}$

Estimate each answer.

21. 318 chairs. 8 rows.
How many chairs in each row ?

22. 274 books. 9 boxes.
How many books in each box ?

Reflected answers, Set 29: 1. 20, 2. 100, 5. 80, 6. 70, 9. 90, 10. 80, 13. 700, 14. 200, 17. 3, 18. 8

Set 30 — *For use with page 183*

Solve the equations.

1. $4 \times 58 = (4 \times 50) + (4 \times 8) = n$
2. $3 \times 47 = (3 \times 40) + (3 \times 7) = n$
3. $6 \times 36 = (6 \times 30) + (6 \times 6) = n$
4. $5 \times 29 = (5 \times 20) + (5 \times 9) = n$
5. $6 \times 21 = (6 \times 20) + (6 \times 1) = n$
6. $8 \times 35 = (8 \times 30) + (8 \times 5) = n$
7. $3 \times 82 = (3 \times 80) + (3 \times 2) = n$
8. $5 \times 73 = (5 \times 70) + (5 \times 3) = n$
9. $9 \times 34 = (9 \times 30) + (9 \times 4) = n$
10. $4 \times 96 = (4 \times 90) + (4 \times 6) = n$
11. $8 \times 75 = (8 \times 70) + (8 \times 5) = n$
12. $5 \times 17 = (5 \times 10) + (5 \times 7) = n$
13. $4 \times 74 = (4 \times 70) + (4 \times 4) = n$
14. $9 \times 61 = (9 \times 60) + (9 \times 1) = n$
15. $3 \times 57 = (3 \times 50) + (3 \times 7) = n$
16. $6 \times 92 = (6 \times 90) + (6 \times 2) = n$
17. $8 \times 24 = (8 \times 20) + (8 \times 4) = n$
18. $7 \times 66 = (7 \times 60) + (7 \times 6) = n$
19. $5 \times 87 = (5 \times 80) + (5 \times 7) = n$
20. $4 \times 39 = (4 \times 30) + (4 \times 9) = n$

Reflected answers, Set 30: 1. 232, 2. 141, 3. 216, 11. 600, 12. 85, 13. 296

Set 31 — *For use with page 185*

Find the products.

1. 43×2	**2.** 57×4	**3.** 36×3	**4.** 58×5	**5.** 49×4	**6.** 27×6	**7.** 34×8
8. 83×7	**9.** 76×9	**10.** 32×3	**11.** 74×2	**12.** 56×5	**13.** 77×7	**14.** 84×6

Solve the equations.

15. $5 \times 6 \times 7 = n$
16. $5 \times 4 \times 9 = n$
17. $8 \times 3 \times 4 = n$
18. $2 \times 6 \times 9 = n$
19. $2 \times 5 \times 7 = n$
20. $9 \times 5 \times 3 = n$
21. $6 \times 6 \times 6 = n$
22. $4 \times 3 \times 6 = n$
23. $7 \times 2 \times 6 = n$
24. $3 \times 8 \times 5 = n$
25. $9 \times 4 \times 6 = n$
26. $5 \times 7 \times 5 = n$

Reflected answers, Set 31: 1. 86, 2. 228, 3. 108, 4. 290, 5. 196, 6. 162, 7. 272, 12. 280, 19. 70, 23. 84

Set 32 — *For use with page 187*

Find the products.

1. 435 × 2	2. 276 × 4	3. 4134 × 6	4. 2483 × 8	5. 787 × 3	6. 3462 × 5
7. 563 × 2	8. 8765 × 9	9. 406 × 3	10. 3120 × 8	11. 865 × 4	12. 9673 × 7

Find the products.

13. 3 × 7 × 34	**17.** 86 × 7 × 3	**21.** 6 × 35 × 4
14. 6 × 9 × 15	**18.** 46 × 9 × 3	**22.** 8 × 4 × 21
15. 7 × 24 × 4	**19.** 3 × 94 × 9	**23.** 73 × 2 × 6
16. 4 × 42 × 5	**20.** 5 × 4 × 61	**24.** 4 × 43 × 7

Reflected answers, Set 32: 1. 870, 2. 1104, 3. 24 804, 4. 19 864, 5. 2361, 6. 17 310, 13. 714, 17. 1806, 21. 840

Set 33 — *For use with page 191*

Find the products.

1. 39 × 80	2. 27 × 90	3. 35 × 40	4. 56 × 70	5. 63 × 30	6. 91 × 80
7. 87 × 20	8. 45 × 50	9. 37 × 60	10. 64 × 90	11. 79 × 80	12. 47 × 30
13. 56 × 40	14. 35 × 20	15. 93 × 70	16. 52 × 50	17. 74 × 60	18. 23 × 90

Reflected answers, Set 33: 1. 3120, 2. 2430, 3. 1400, 4. 3920, 5. 1890, 6. 7280

Set 34 *For use with page 193*

Find the products.

1. 23 × 34	**2.** 57 × 25	**3.** 19 × 27	**4.** 18 × 71	**5.** 39 × 62	**6.** 56 × 43	**7.** 75 × 54
8. 36 × 45	**9.** 45 × 98	**10.** 15 × 66	**11.** 77 × 59	**12.** 68 × 18	**13.** 59 × 77	**14.** 41 × 26
15. 425 × 32	**16.** 173 × 46	**17.** 218 × 57	**18.** 423 × 38	**19.** 561 × 94	**20.** 789 × 62	**21.** 343 × 71
22. 785 × 75	**23.** 936 × 68	**24.** 421 × 56	**25.** 507 × 49	**26.** 683 × 34	**27.** 590 × 28	**28.** 789 × 87

Reflected answers, Set 34: 1. 782, 2. 1425, 3. 513, 4. 1278, 5. 2418, 6. 2408, 7. 4050

Set 35 *For use with page 197*

Solve each short story problem.

1. 46 bags. 25 kilograms of potatoes in each bag. How many kilograms of potatoes ?

2. 28 books. 88 pages in each book. How many pages in all ?

3. 14 crates. 86 oranges in each crate. How many oranges in all ?

4. Drove 60 kilometres per hour for 12 hours. Drove how many km ?

5. 14 classes. 32 students in each class. How many students ?

6. 31 days in May. 24 hours in each day. How many hours in May ?

Reflected answers, Set 35: 1. 1150, 4. 720

Set 36 *For use with page 199*

Find the products.

1. 343 × 71	**2.** 629 × 84	**3.** 146 × 242	**4.** 257 × 204	**5.** 375 × 155	**6.** 807 × 263
7. 709 × 87	**8.** 378 × 95	**9.** 466 × 376	**10.** 394 × 485	**11.** 580 × 297	**12.** 925 × 634
13. 648 × 705	**14.** 647 × 192	**15.** 852 × 380	**16.** 739 × 478	**17.** 139 × 637	**18.** 820 × 445

19. 7 × 4 × 8 × 3	**24.** 321 × 6 × 5	**29.** 47 × 26 × 8
20. 4 × 7 × 6 × 5	**25.** 46 × 9 × 3	**30.** 31 × 57 × 4
21. 5 × 4 × 6 × 9	**26.** 463 × 8 × 6	**31.** 597 × 32 × 2
22. 6 × 7 × 5 × 4	**27.** 9 × 595 × 7	**32.** 66 × 71 × 84
23. 8 × 3 × 266	**28.** 341 × 2 × 5	**33.** 37 × 20 × 93

Reflected answers, Set 36: 1. 24 353, 2. 52 836, 3. 35 332, 4. 52 428, 5. 58 125, 6. 212 241, 19. 672, 24. 9630, 29. 9776

Set 37 *For use with page 200*

Solve each short story problem.

1. 55 minutes to deliver papers each day. 31 days in March. How many minutes delivering papers in March?

2. 1000 grams ⟶ 1 kilogram. 56 kilograms. How many grams?

3. 23 motels. 84 rooms in each motel. How many rooms in all?

4. 104 passengers per plane. 32 planes. How many passengers?

Reflected answers, Set 37: 1. 1705, 3. 1932

Set 38 — *For use with page 225*

Find the largest whole number that will make each sentence true.
Then find the quotient.

1. $n \times 7 < 31 \rightarrow 7\overline{)31}$	**6.** $n \times 5 < 42 \rightarrow 5\overline{)42}$
2. $n \times 4 < 23 \rightarrow 4\overline{)23}$	**7.** $n \times 7 < 61 \rightarrow 7\overline{)61}$
3. $n \times 8 < 50 \rightarrow 8\overline{)50}$	**8.** $n \times 9 < 60 \rightarrow 9\overline{)60}$
4. $n \times 3 < 19 \rightarrow 3\overline{)19}$	**9.** $n \times 6 < 22 \rightarrow 6\overline{)22}$
5. $n \times 6 < 51 \rightarrow 6\overline{)51}$	**10.** $n \times 4 < 19 \rightarrow 4\overline{)19}$

Find the quotients and the remainders.

11. $8\overline{)67}$	**14.** $6\overline{)46}$	**17.** $7\overline{)58}$	**20.** $4\overline{)27}$	**23.** $9\overline{)77}$
12. $4\overline{)33}$	**15.** $9\overline{)83}$	**18.** $3\overline{)26}$	**21.** $6\overline{)52}$	**24.** $5\overline{)32}$
13. $7\overline{)51}$	**16.** $5\overline{)33}$	**19.** $8\overline{)46}$	**22.** $7\overline{)37}$	**25.** $8\overline{)49}$

Reflected answers, Set 38: 1. 4; 4 R3, 2. 5; 5 R3, 6. 8; 8 R2, 7. 8; 8 R5, 11. 8 R3, 14. 7 R4, 17. 8 R2, 20. 6 R3, 23. 8 R5

Set 39 — *For use with page 229*

Find the quotients and remainders.

1. $3\overline{)94}$	**2.** $4\overline{)137}$	**3.** $4\overline{)326}$	**4.** $6\overline{)206}$	**5.** $7\overline{)649}$
6. $6\overline{)87}$	**7.** $5\overline{)325}$	**8.** $3\overline{)243}$	**9.** $5\overline{)359}$	**10.** $6\overline{)568}$
11. $4\overline{)93}$	**12.** $9\overline{)456}$	**13.** $2\overline{)109}$	**14.** $3\overline{)147}$	**15.** $4\overline{)167}$
16. $7\overline{)88}$	**17.** $7\overline{)463}$	**18.** $8\overline{)436}$	**19.** $4\overline{)278}$	**20.** $8\overline{)365}$
21. $5\overline{)97}$	**22.** $6\overline{)378}$	**23.** $9\overline{)643}$	**24.** $8\overline{)734}$	**25.** $5\overline{)342}$

Reflected answers, Set 39: 1. 31 R1, 2. 34 R1, 3. 81 R2, 4. 34 R2, 5. 92 R5, 6. 14 R3, 7. 65 R0, 8. 81 R0, 9. 71 R4, 10. 94 R4

Set 40 *For use with page 231*

Find the quotients and remainders. Check each answer.

1. 9)672	**5.** 8)747	**9.** 6)168	**13.** 9)757	**17.** 5)246
2. 8)362	**6.** 5)429	**10.** 9)168	**14.** 7)461	**18.** 3)287
3. 5)372	**7.** 6)442	**11.** 7)177	**15.** 6)596	**19.** 8)321
4. 6)259	**8.** 8)534	**12.** 9)602	**16.** 4)307	**20.** 7)617

Solve each short story problem. Check each answer.

21. 374 bottles.
6 bottles in each carton.
How many cartons?

22. 212 tomato plants.
4 rows. How many plants in each row?

Reflected answers, Set 40: 1. 74 R6, 5. 93 R3, 9. 28, 13. 84 R1, 17. 49 R1

Set 41 *For use with page 233*

Find the average of the numbers in each set.

1. {5, 3, 10}	**5.** {8, 7, 9, 4}	**9.** {26, 35, 29}	**13.** {9, 7, 8, 3, 6, 9}
2. {8, 4, 3}	**6.** {7, 9, 9, 15}	**10.** {80, 73, 30}	**14.** {12, 15, 11, 10}
3. {11, 9, 7}	**7.** {23, 31}	**11.** {47, 56, 23}	**15.** {78, 45, 99, 26}
4. {6, 4, 8}	**8.** {56, 72}	**12.** {94, 88, 37}	**16.** {87, 70, 32, 52, 54}

Solve each short story problem.

17. John 28 kilograms, Joe 32 kilograms, Jim 33 kilograms. What is their average weight?

18. Dart scores: 26, 34, 21
Average score?

Reflected answers, Set 41: 1. 6, 5. 7, 9. 30, 13. 7

Set 42 *For use with page 235*

From the set {100, 200, 300 . . .}, find the largest number that will make the sentence true.

1. $n \times 7 < 2361 \rightarrow 7\overline{)2361}$	**5.** $n \times 9 < 6737 \rightarrow 9\overline{)6737}$
2. $n \times 4 < 1820 \rightarrow 4\overline{)1820}$	**6.** $n \times 5 < 4831 \rightarrow 5\overline{)4831}$
3. $n \times 6 < 4933 \rightarrow 6\overline{)4933}$	**7.** $n \times 8 < 6558 \rightarrow 8\overline{)6558}$
4. $n \times 3 < 2222 \rightarrow 3\overline{)2222}$	**8.** $n \times 4 < 2521 \rightarrow 4\overline{)2521}$

Find each quotient and remainder.

9. $6\overline{)2438}$	**13.** $9\overline{)5837}$	**17.** $7\overline{)5048}$	**21.** $7\overline{)3851}$	**25.** $7\overline{)4376}$
10. $8\overline{)5307}$	**14.** $8\overline{)5946}$	**18.** $9\overline{)3929}$	**22.** $6\overline{)4836}$	**26.** $6\overline{)3542}$
11. $7\overline{)2359}$	**15.** $9\overline{)6308}$	**19.** $4\overline{)1586}$	**23.** $8\overline{)7534}$	**27.** $5\overline{)3964}$
12. $4\overline{)3346}$	**16.** $6\overline{)4524}$	**20.** $5\overline{)5003}$	**24.** $9\overline{)8463}$	**28.** $4\overline{)2746}$

Reflected answers, Set 42: 1. 300, 5. 700, 9. 406 R2, 13. 648 R5, 17. 721 R1, 21. 550 R1, 25. 625 R1

Set 43 *For use with page 241*

Find each quotient and remainder.

1. $60\overline{)380}$	**5.** $30\overline{)2270}$	**9.** $50\overline{)4372}$	**13.** $30\overline{)1470}$
2. $40\overline{)210}$	**6.** $50\overline{)1630}$	**10.** $60\overline{)5818}$	**14.** $40\overline{)3772}$
3. $90\overline{)543}$	**7.** $40\overline{)1427}$	**11.** $90\overline{)4190}$	**15.** $80\overline{)2341}$
4. $70\overline{)499}$	**8.** $80\overline{)4563}$	**12.** $70\overline{)4437}$	**16.** $50\overline{)4211}$

Reflected answers, Set 43: 1. 6 R20, 5. 75 R20, 9. 87 R22, 13. 49

Set 44 *For use with page 243*

Find the quotients and remainders.

1. $31\overline{)206}$	**6.** $63\overline{)520}$	**11.** $43\overline{)3659}$	**16.** $76\overline{)2194}$	**21.** $21\overline{)1778}$
2. $29\overline{)193}$	**7.** $77\overline{)410}$	**12.** $68\overline{)4809}$	**17.** $61\overline{)2431}$	**22.** $42\overline{)2190}$
3. $52\overline{)413}$	**8.** $54\overline{)317}$	**13.** $26\overline{)4390}$	**18.** $58\overline{)4153}$	**23.** $84\overline{)6414}$
4. $48\overline{)463}$	**9.** $61\overline{)271}$	**14.** $37\overline{)2784}$	**19.** $42\overline{)3251}$	**24.** $61\overline{)1591}$
5. $27\overline{)223}$	**10.** $89\overline{)675}$	**15.** $44\overline{)3874}$	**20.** $23\overline{)1148}$	**25.** $36\overline{)2648}$

Solve each short story problem.

26. 12 in 1 dozen.
364 eggs.
How many dozen eggs?

27. 24 hours ⟶ 1 day.
534 hours.
How many days?

Reflected answers, Set 44: 1. 6 R20, 2. 6 R19, 6. 8 R16, 7. 5 R25, 11. 85 R4, 12. 70 R49, 16. 28 R66, 17. 39 R52, 21. 84 R14, 22. 52 R6

Set 45 *For use with page 245*

Solve each short story problem.

1. 7 days ⟶ 1 week.
280 days.
How many weeks?

2. 52 weeks ⟶ 1 year.
208 weeks.
How many years?

3. 24 bottles per case.
192 bottles.
How many cases?

4. 8 tires per airplane.
464 tires.
How many airplanes?

Reflected answers, Set 45: 1. 40, 3. 8

Set 46 *For use with page 255*

1. List the factors of 15.
2. List the factors of 16.
3. List the factors of 18.
4. List the factors of 20.
5. List the factors of 24.
6. List the factors of 28.
7. List the factors of 30.
8. List the factors of 36.

Use your answers for 1-8 to answer the following questions.

9. List the common factors of 12 and 16.
10. What is the greatest common factor of 12 and 16?
11. List the common factors of 24 and 30.
12. What is the greatest common factor of 24 and 30?
13. List the common factors of 20 and 28.
14. What is the greatest common factor of 20 and 28?
15. List the common factors of 24 and 36.
16. What is the greatest common factor of 24 and 36?

Reflected answers, Set 46: 1. 1, 3, 5, 15, 5. 1, 2, 3, 4, 6, 8, 12, 24,
9. 1, 2, 4, 10. 4

Set 47 *For use with page 259*

Tell whether each number is prime or not prime.

1. 17	**3.** 33	**5.** 25	**7.** 41	**9.** 57	**11.** 39	**13.** 71
2. 52	**4.** 69	**6.** 27	**8.** 37	**10.** 51	**12.** 23	**14.** 43

Write an equation to show that each number is the product of prime numbers.

15. 21	**17.** 28	**19.** 26	**21.** 32	**23.** 38	**25.** 40
16. 15	**18.** 12	**20.** 27	**22.** 34	**24.** 39	**26.** 42

Reflected answers, Set 47: 1. prime, 3. not prime, 5. not prime
7. prime, 9. not prime, 11. not prime, 13. prime, 15. 21 = 3 × 7
17. 28 = 2 × 2 × 7, 19. 26 = 2 × 13, 21. 32 = 2 × 2 × 2 × 2 × 2
23. 38 = 2 × 19, 25. 40 = 2 × 2 × 2 × 5

Set 48 *For use with page 267*

What fraction is suggested by each of these?

1. 3 out of 5
2. 9 out of 11
3. 2 out of 17
4. 7 out of 9
5. 5 out of 8
6. 13 out of 14
7. 6 out of 7
8. 12 out of 13
9. 7 out of 10

Write a fraction for each number-pair story.

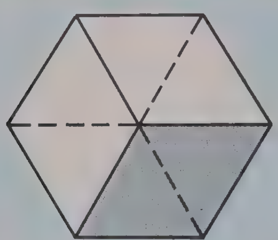
10. 15 cookies in the cookie jar. Sue ate 2 of them. What fraction of the cookies did she eat?

11. 7 cars in the parking lot. 3 are blue. What fraction of the cars are blue?

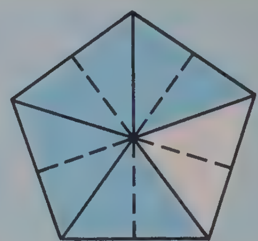
Reflected answers, Set 48: 1. $\frac{3}{5}$, 4. $\frac{7}{9}$, 7. $\frac{6}{7}$

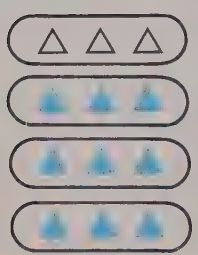
Set 49 *For use with page 275*

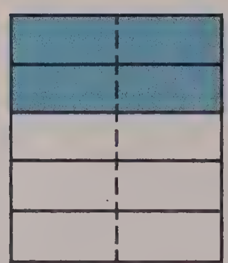
Write the pair of equivalent fractions suggested by each picture.

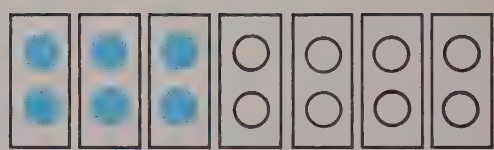
1.


2.


3.


4.


5.


6.


Reflected answers, Set 49: 1. $\frac{1}{3}$, $\frac{2}{6}$, 2. $\frac{1}{4}$, $\frac{2}{8}$, 3. $\frac{4}{5}$, $\frac{8}{10}$

Set 50 *For use with page 277*

Find the next three fractions for each set of equivalent fractions.

1. $\{\frac{3}{5}, \frac{6}{10}, \frac{9}{15}, \ldots\}$
2. $\{\frac{2}{3}, \frac{4}{6}, \frac{6}{9}, \ldots\}$
3. $\{\frac{2}{9}, \frac{4}{18}, \frac{6}{27}, \ldots\}$
4. $\{\frac{2}{5}, \frac{4}{10}, \frac{6}{15}, \ldots\}$
5. $\{\frac{3}{11}, \frac{6}{22}, \frac{9}{33}, \ldots\}$
6. $\{\frac{3}{7}, \frac{6}{14}, \frac{9}{21}, \ldots\}$
7. $\{\frac{1}{10}, \frac{2}{20}, \frac{3}{30}, \ldots\}$
8. $\{\frac{7}{8}, \frac{14}{16}, \frac{21}{24}, \ldots\}$

Reflected answers, Set 50: 1. $\frac{12}{20}, \frac{15}{25}, \frac{18}{30}$, 5. $\frac{12}{44}, \frac{15}{55}, \frac{18}{66}$

Set 51 *For use with page 289*

Tell whether or not the two fractions are equivalent.

1. $\frac{2}{5}, \frac{7}{35}$
2. $\frac{3}{11}, \frac{8}{44}$
3. $\frac{5}{6}, \frac{35}{42}$
4. $\frac{5}{2}, \frac{15}{6}$
5. $\frac{4}{9}, \frac{3}{8}$
6. $\frac{3}{2}, \frac{24}{16}$
7. $\frac{3}{10}, \frac{12}{40}$
8. $\frac{7}{6}, \frac{48}{46}$
9. $\frac{5}{8}, \frac{40}{64}$
10. $\frac{3}{5}, \frac{2}{3}$

Find the lowest-terms fraction in each set of equivalent fractions.

11. $\{\frac{20}{24}, \frac{35}{42}, \frac{5}{6}, \frac{10}{12}, \frac{45}{54}\}$
12. $\{\frac{24}{64}, \frac{6}{16}, \frac{21}{56}, \frac{3}{8}, \frac{9}{24}\}$
13. $\{\frac{6}{27}, \frac{2}{9}, \frac{10}{45}, \frac{4}{18}, \frac{20}{90}\}$
14. $\{\frac{25}{55}, \frac{50}{110}, \frac{5}{11}, \frac{15}{33}, \frac{35}{77}\}$
15. $\{\frac{7}{10}, \frac{63}{90}, \frac{42}{60}, \frac{56}{80}, \frac{28}{40}\}$
16. $\{\frac{64}{56}, \frac{16}{14}, \frac{32}{28}, \frac{48}{42}, \frac{8}{7}\}$
17. $\{\frac{7}{4}, \frac{28}{16}, \frac{63}{36}, \frac{49}{28}, \frac{14}{8}\}$
18. $\{\frac{50}{10}, \frac{25}{5}, \frac{45}{9}, \frac{5}{1}, \frac{40}{8}\}$
19. $\{\frac{16}{10}, \frac{8}{5}, \frac{64}{40}, \frac{72}{45}, \frac{48}{30}\}$
20. $\{\frac{35}{14}, \frac{10}{4}, \frac{60}{24}, \frac{20}{8}, \frac{5}{2}\}$

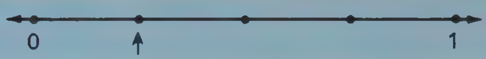
Give the lowest-terms fraction for each fraction.

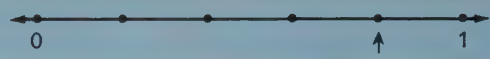
21. $\frac{9}{21}$
22. $\frac{15}{18}$
23. $\frac{16}{12}$
24. $\frac{15}{20}$
25. $\frac{9}{15}$
26. $\frac{18}{27}$
27. $\frac{8}{12}$
28. $\frac{24}{32}$
29. $\frac{6}{14}$
30. $\frac{10}{16}$

Reflected answers, Set 51: 1. no, 3. yes, 5. no, 7. yes, 9. yes, 11. $\frac{5}{6}$, 16. $\frac{8}{7}$

Set 52 *For use with page 323*

Give the lowest-terms fraction for the point over the arrow.

1. 

2. 

3. 

4. 

5. 

6. 

Give two fractions for the point over the arrow.

7. 

8. 

9. 

10. 

11. 

12. 

Reflected answers, Set 52: 1. $\frac{1}{4}$, 2. $\frac{4}{5}$, 7. $\frac{2}{5}$, $\frac{4}{10}$, 8. $\frac{6}{8}$, $\frac{3}{4}$

Set 53 *For use with page 325*

Find the missing numerators and denominators.

1. $\frac{4}{8} = \frac{1}{\square}$

2. $\frac{6}{9} = \frac{\square}{3}$

3. $\frac{4}{8} = \frac{\square}{2}$

4. $\frac{3}{9} = \frac{1}{\square}$

5. $\frac{2}{14} = \frac{\square}{7}$

6. $\frac{7}{14} = \frac{\square}{2}$

7. $\frac{6}{14} = \frac{3}{\square}$

8. $\frac{8}{14} = \frac{\square}{7}$

9. $\frac{5}{15} = \frac{\square}{3}$

10. $\frac{10}{15} = \frac{\square}{3}$

11. $\frac{3}{15} = \frac{1}{\square}$

12. $\frac{6}{15} = \frac{\square}{5}$

13. $\frac{4}{16} = \frac{\square}{4}$

14. $\frac{2}{16} = \frac{1}{\square}$

15. $\frac{8}{16} = \frac{\square}{2}$

16. $\frac{3}{18} = \frac{\square}{6}$

17. $\frac{15}{18} = \frac{\square}{6}$

18. $\frac{9}{18} = \frac{\square}{2}$

19. $\frac{12}{18} = \frac{\square}{3}$

20. $\frac{16}{18} = \frac{\square}{9}$

Reflected answers, Set 53: 1. 2, 2. 2, 6. 1, 7. 7, 11. 5, 12. 2, 16. 1, 17. 5

Set 54 *For use with page 331*

Write the symbol (<, =, >) for each ▒.

1. $\frac{1}{2}$ ▒ $\frac{2}{4}$	**5.** $\frac{1}{4}$ ▒ $\frac{1}{2}$	**9.** $\frac{1}{3}$ ▒ $\frac{1}{6}$	**13.** $\frac{1}{3}$ ▒ $\frac{2}{6}$	**17.** $\frac{1}{4}$ ▒ $\frac{1}{3}$
2. $\frac{5}{8}$ ▒ $\frac{3}{8}$	**6.** $\frac{4}{12}$ ▒ $\frac{3}{9}$	**10.** $\frac{2}{3}$ ▒ $\frac{5}{6}$	**14.** $\frac{4}{8}$ ▒ $\frac{5}{5}$	**18.** $\frac{1}{12}$ ▒ $\frac{1}{2}$
3. $\frac{1}{3}$ ▒ $\frac{4}{6}$	**7.** $\frac{1}{5}$ ▒ $\frac{1}{2}$	**11.** $\frac{1}{4}$ ▒ $\frac{1}{8}$	**15.** $\frac{1}{4}$ ▒ $\frac{2}{8}$	**19.** $\frac{5}{6}$ ▒ $\frac{1}{1}$
4. $\frac{3}{4}$ ▒ $\frac{3}{8}$	**8.** $\frac{1}{10}$ ▒ $\frac{1}{5}$	**12.** $\frac{3}{4}$ ▒ $\frac{15}{20}$	**16.** $\frac{4}{4}$ ▒ $\frac{5}{5}$	**20.** $\frac{7}{8}$ ▒ $\frac{15}{16}$

Reflected answers, Set 54: 1. =, 5. <, 9. >, 13. =, 17. <

Set 55 *For use with page 337*

Give the missing numerators and denominators.

1. $4 = \frac{▒}{2}$	**5.** $16 = \frac{▒}{2}$	**9.** $6 = \frac{54}{▒}$	**13.** $14 = \frac{▒}{3}$
2. $2 = \frac{10}{▒}$	**6.** $12 = \frac{36}{▒}$	**10.** $4 = \frac{▒}{4}$	**14.** $\frac{1}{6} = \frac{▒}{12}$
3. $7 = \frac{▒}{6}$	**7.** $5 = \frac{▒}{6}$	**11.** $8 = \frac{32}{▒}$	**15.** $\frac{3}{5} = \frac{6}{▒}$
4. $3 = \frac{24}{▒}$	**8.** $9 = \frac{27}{▒}$	**12.** $10 = \frac{40}{▒}$	**16.** $\frac{2}{3} = \frac{▒}{12}$

Find the sums.

17. $\frac{8}{2} + \frac{1}{2}$	**22.** $6 + \frac{4}{5}$	**27.** $\frac{18}{6} + \frac{1}{6}$	**32.** $5 + \frac{2}{3}$
18. $\frac{4}{4} + \frac{1}{4}$	**23.** $4 + \frac{1}{6}$	**28.** $\frac{12}{3} + \frac{1}{3}$	**33.** $7 + \frac{4}{9}$
19. $\frac{6}{3} + \frac{2}{3}$	**24.** $3 + \frac{2}{3}$	**29.** $7 + \frac{3}{8}$	**34.** $\frac{9}{9} + \frac{2}{9}$
20. $\frac{12}{4} + \frac{1}{4}$	**25.** $\frac{15}{5} + \frac{1}{5}$	**30.** $\frac{8}{8} + \frac{5}{8}$	**35.** $\frac{24}{6} + \frac{1}{6}$
21. $\frac{12}{6} + \frac{5}{6}$	**26.** $9 + \frac{1}{8}$	**31.** $\frac{12}{6} + \frac{5}{6}$	**36.** $\frac{20}{5} + \frac{3}{5}$

Reflected answers, Set 55: 1. 8, 5. 32, 9. 9, 13. 42, 17. $\frac{9}{2}$, 22. $6\frac{4}{5}$, 27. $\frac{19}{6}$, 32. $5\frac{2}{3}$

Set 56 *For use with page 339*

Give the mixed numeral for each sum.

1. $4 + \frac{1}{4}$	**6.** $\frac{8}{4} + \frac{1}{4}$	**11.** $5 + \frac{1}{12}$	**16.** $\frac{21}{3} + \frac{2}{3}$
2. $\frac{3}{3} + \frac{1}{3}$	**7.** $\frac{15}{3} + \frac{2}{3}$	**12.** $\frac{12}{12} + \frac{5}{12}$	**17.** $\frac{14}{2} + \frac{1}{2}$
3. $\frac{12}{4} + \frac{3}{4}$	**8.** $13 + \frac{2}{5}$	**13.** $\frac{18}{6} + \frac{1}{6}$	**18.** $3 + \frac{7}{8}$
4. $7 + \frac{3}{8}$	**9.** $\frac{9}{9} + \frac{4}{9}$	**14.** $\frac{9}{3} + \frac{2}{3}$	**19.** $5 + \frac{9}{10}$
5. $6 + \frac{5}{8}$	**10.** $\frac{10}{5} + \frac{3}{5}$	**15.** $\frac{14}{7} + \frac{2}{7}$	**20.** $\frac{5}{5} + \frac{1}{5}$

Give a mixed numeral for each fraction.

21. $\frac{7}{2}$	**24.** $\frac{15}{7}$	**27.** $\frac{10}{3}$	**30.** $\frac{21}{8}$	**33.** $\frac{9}{5}$	**36.** $\frac{43}{8}$
22. $\frac{11}{4}$	**25.** $\frac{21}{5}$	**28.** $\frac{16}{5}$	**31.** $\frac{6}{4}$	**34.** $\frac{29}{6}$	**37.** $\frac{52}{7}$
23. $\frac{13}{6}$	**26.** $\frac{36}{7}$	**29.** $\frac{17}{4}$	**32.** $\frac{8}{3}$	**35.** $\frac{18}{5}$	**38.** $\frac{31}{9}$

Reflected answers, Set 56: 1. $4\frac{1}{4}$, 6. $2\frac{1}{4}$, 11. $5\frac{1}{12}$, 16. $7\frac{2}{3}$, 21. $3\frac{1}{2}$, 24. $2\frac{1}{7}$, 27. $3\frac{1}{3}$, 30. $2\frac{5}{8}$, 33. $1\frac{4}{5}$, 36. $5\frac{3}{8}$

Set 57 *For use with page 341*

Find each sum.

1. $\frac{1}{2} + \frac{1}{2}$	**3.** $\frac{2}{5} + \frac{1}{5}$	**5.** $\frac{5}{2} + \frac{4}{2}$	**7.** $3 + \frac{1}{3}$
2. $2\frac{1}{5} + 1\frac{2}{5}$	**4.** $5\frac{2}{6} + 3\frac{1}{6}$	**6.** $4\frac{2}{3} + 6\frac{1}{3}$	**8.** $3\frac{1}{12} + 5\frac{3}{12}$

Solve each short story problem.

9. $2\frac{1}{2}$ dozen cookies baked.
$1\frac{1}{4}$ dozen more to bake.
How many cookies in all ?

10. Recipe: $\frac{1}{2}$ litre milk,
$\frac{1}{4}$ litre water.
How much liquid in all ?

Reflected answers, Set 57: 1. 1, 3. $\frac{3}{5}$, 5. $\frac{9}{2}$ or $4\frac{1}{2}$, 7. $3\frac{1}{3}$

Books to Explore

Adler, Irving. ***The Giant Book of Mathematics.***
New York, Golden Press, 1960.
(Available from Whitman Golden Ltd., Cambridge, Ontario)

Have you ever wondered how a tree grows or why a volcano is shaped as it is or what makes a card trick work? This colorful book answers these and many other questions, through exploring the world of mathematics. You'll find all kinds of exciting ideas about numbers and what they mean in our daily lives. Here are just a few of the interesting topics:

What an Egyptian carpenter used for a ruler 14
How to locate north with a stick and a watch 60
The speed of a falling satellite 65
Your chance of getting 2 heads when you toss 2 coins 73

Hogben, Lancelot. ***The Wonderful World of Mathematics.***
New York, Doubleday, 1968.
(Available from Doubleday Publishers, Toronto)

This book shows that the story of how man became civilized is also the story of how mathematics became a science. You will enjoy going back to the time of the cave man and finding out how man learned to measure and to count, to build and to navigate, to design and to calculate with computers.

Some topics covered in this book are:

The geometry of land measuring 17
How the Greeks measured the earth 36
Hindu numerals 45
Arabian lattice multiplication 50
Invention of the telescope 61

Jonas, Arthur. ***New Ways in Math.***
Englewood Cliffs, New Jersey, Prentice-Hall, Inc., 1962.
(Available from Prentice-Hall of Canada Ltd., Scarborough, Ontario)

Cartoons tell the story of mathematics, including sets, probability, and algebra, and make this book fun to read. The chapter ''Men in Math'' on page 62 describes contemporary mathematicians, like Einstein and Von Neumann, as well as those from the past, like Pythagoras and Archimedes.

Other chapters you'll probably find exciting include:

The magic of two 24
When 1001 = 9 31
What is your hunch? 45
Doughnuts and pretzels 50
Math without numbers 57

You may also enjoy reading *More New Ways in Math* (1964), by Mr. Jonas.

Here are some other books you may enjoy:

Adler, Irving and Ruth. ***Numerals: New Dresses for Old Numbers.***
New York, The John Day Company, 1964.
(Longman Canada Ltd., Don Mills, Ont.)
Several new ways of counting are clearly explained in this little book. The authors tell how to change numerals to other bases, then add and multiply; they also explain place value.

Andrews, F. Emerson. ***Numbers, Please.***
Boston, Little, Brown and Company, 1961.
(Little, Brown & Co. (Canada) Ltd., Toronto)
This book about numbers from base 2 to 12 tells how counting began, how to use an abacus, and what decimals mean. You'll learn useful shortcuts in figuring, too.

Bendick, Jeanne. ***The First Book of Time.***
New York, Watts, 1963.
(Grolier Limited, Toronto)
Excellent pictures help trace the history of time and how we measure it. All kinds of clocks are described—from sun dials and water clocks to the atomic clock and clocks in your body.

Bendick, Jeanne and Levin, Marcia. ***Mathematics Illustrated Dictionary.***
New York, McGraw-Hill, 1965.
(McGraw-Hill Ryerson, Scarborough, Ontario)
A handy tool for students. If you need to know about ancient or contemporary mathematicians, mathematical terms and definitions, or any facts and figures, use this dictionary.

Feravolo, Rocco. ***Wonders of Mathematics.***
New York, Dodd, Mead Book Company, 1963.
(Dodd, Mead & Co. (Canada) Ltd., Toronto)
This book uses many activities to develop several bases and number systems.

Kettlekamp, Larry. ***Spirals.***
Englewood Cliffs, New Jersey, Prentice-Hall, Inc., 1964.
(Prentice-Hall of Canada Ltd., Scarborough, Ontario)
An enjoyable look at spirals—some are in nature, some man-made.

Leeming, Joseph. ***Fun with Puzzles.***
Philadelphia, J. B. Lippincott Company, 1946.
Also available in paperback from Scholastic Book Service, 1966.
(McClelland & Stewart Ltd., Toronto)
This book contains more than 200 match, coin, paper-and-pencil, cutout, and word puzzles. The answers are all in the back of the book.

Massoglia, Elinor. ***Fun-Time Paper Folding.***
Chicago, Children's Press, 1959.
(Scholars Choice Limited, Stratford, Ont.)
Many kinds of objects and shapes to make. No cutting and pasting as each shape can be folded from a single piece of paper.

Shulman, Alix. ***Bosley on the Number Line.***
New York, McKay Company, 1970.
(Musson Book Company, Don Mills, Ontario)
Here is an adventure story with a mathematical plot, all of which adds up to a fun book.

Simon, Leonard and Bendick, Jeanne. ***The Day the Numbers Disappeared.***
New York, McGraw-Hill Book Company, 1963.
(McGraw-Hill Ryerson, Scarborough, Ontario)
By taking numbers away from his class, Mr. Dibbs shows why we need numbers in everyday life. The Egyptian, Greek, and Roman number marks are traced and compared.

Sitomer, Mindel and Sitomer, Harry. ***What Is Symmetry?***
New York, Thomas Y. Crowell, 1970.
(Fitzhenry & Whiteside Ltd., Don Mills, Ont.)
Take a tour with a colorful alligator to see the point symmetry in a clover leaf, the plane symmetry in a mirror reflection, or the symmetry in the arc of a comet's orbit.

Steadman, Ralph. ***The Little Red Computer.***
New York, McGraw-Hill Book Company, 1969.
(McGraw-Hill Ryerson, Scarborough, Ontario)
The little red computer dropped out of a robot-instructed school because he could never make sense of numbers. Finally, he gets a chance in a space adventure.

"Wise Owl Books."
New York, Holt, Rinehart and Winston, 1965.
(Holt, Rinehart and Winston of Canada Ltd., Toronto)
A set of 20 books for enjoyable and informative reading. These five have to do with mathematics:
I've Got Your Number, John, by **Olive Berg;**
Millions of People, by **Thomas Dripdale and John Dunworth;**
Number Patterns Make Sense, by **Howard Fehr;**
Dr. Frick and His Fractions, by **Henry W. Ford;**
Optical Illusions, by **Jack and Robert Strimban.**

Glossary

addend Any one of a set of numbers to be added. In the equation $4 + 5 = 9$, the numbers 4 and 5 are addends.
addition An operation that combines a first number and a second number to give exactly one number. The two numbers are called addends, and the one number which is the result of combining the two numbers is called the sum of the addends.
angle Two rays from a single point.

approximation One number is an approximation of another number if the first number is suitably "close" (according to context) to the other number.
area The area of a closed figure or region is the measure of that region as compared to a given selected region called the unit, usually a square region in the case of area.
borrow A commonly used term for the regrouping process involved in certain types of subtraction.

Example:

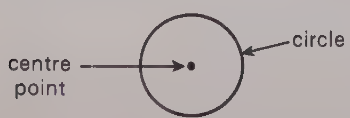
$$\begin{array}{r} {\scriptstyle 3\ 13} \\ \cancel{4}\ \cancel{3} \\ -1\ 7 \\ \hline \end{array} \rightarrow \begin{array}{r} 3\ 0 \\ -1\ 0 \\ \hline 2\ 0 \end{array} \quad \begin{array}{r} 1\ 3 \\ -7 \\ \hline 6 \end{array} \rightarrow \begin{array}{r} 4\ 3 \\ -1\ 7 \\ \hline 2\ 6 \end{array}$$

carry A commonly used term for the regrouping that is involved in addition.

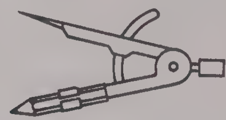
Example:
$$\begin{array}{r} 57 \\ +26 \\ \hline 83 \end{array} \rightarrow \begin{array}{l} 50 + 7 \\ 20 + 6 \\ \hline 70 + 13 = 83 \end{array}$$

centimetre A unit of length. One centimetre is $\frac{1}{100}$ metre.
circumscribed circle A circle is circumscribed about a polygon when each vertex of the polygon is a point of the circle. In the figure, the circle is circumscribed about the triangle.

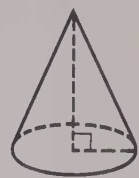
circle The set of all points in a plane which are a specified distance from a given point called the centre or centre point.



common factor When a number is a factor of two different numbers, it is said to be a common factor of the two numbers.
compass A device for drawing models of a circle.



composite number Any whole number greater than 1 that is not prime.
cone Generally thought of as a right circular cone, which is illustrated below.

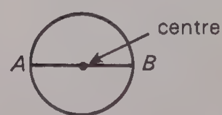


congruent figures Figures that have the same size and shape.

congruent triangles

co-ordinate Number pair used in graphing.
co-ordinate axes Two number lines intersecting at right angles at 0.
count To name numbers in regular succession.
cube A rectangular prism (box) such that all faces are squares.
denominator The number indicated by the numeral below the line in a fraction symbol.
diagonal A segment joining two nonadjacent vertices of a polygon. In the figure, the diagonal is segment *AB*.

diameter A chord that passes through the centre point of the circle.



difference The number resulting from the subtraction operation.

digits The basic Hindu-Arabic symbols used to write numerals. In the base-ten system, these are the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

dividend In the problem 33 ÷ 7, 33 is called the dividend.

Example: $\begin{array}{r} 4 \\ 7\overline{)33} \\ 28 \\ \hline 5 \end{array}$ ← dividend

division An operation related to multiplication as illustrated:

$3 \times 4 = 12 \begin{cases} \nearrow 12 \div 3 = 4 \\ \searrow 12 \div 4 = 3 \end{cases}$

divisor In the problem 33 ÷ 7, 7 is called the divisor.

Example: divisor → $\begin{array}{r} 4 \\ 7\overline{)33} \\ 28 \\ \hline 5 \end{array}$

edge An edge of a space figure is one of the segments making up any one of the faces of the space figure.

empty set A set that has no objects in it.

equality (equals; or =) A mathematical relation of being exactly the same.

equation A mathematical sentence involving the use of the equality symbol.

Examples: $5 + 4 = 9$; $7 + \square = 8$; $n + 3 = 7$.

equivalent fractions Two fractions are equivalent when it can be shown that they each can be used to represent the same amount of a given object. Also, two fractions are equivalent if these two products are the same:

$\frac{3}{4} \quad \frac{6}{8}$ → 4×6 → 24; → 3×8 → 24

equivalent sets Two sets that may be placed in a one-to-one correspondence.

estimate To find an approximation for a given number. (Sometimes a sum, a product, etc.)

even numbers The whole-number multiples of 2 (0, 2, 4, 6, 8, 10, 12, · · ·).

face The face of a given space figure is any one of the plane geometric figures (regions) making up the space figure. For example, in a cube each of the square regions is a face of the cube.

factor See multiplication. The equation $6 \times 7 = 42$ illustrates that both 6 and 7 are factors of 42.

fraction A symbol for a fractional number, usually written $\frac{2}{3}, \frac{3}{4}, \frac{1}{2}$, and so on.

fractional number The one number we think about for each set of equivalent fractions.

graph (1) A set of points associated with a given set of numbers or set of number pairs. (2) A picture used to illustrate a given collection of data. The data might be pictured in the form of a bar graph, a circle graph, a line graph, or a pictograph. (3) To draw the graph of.

greater than (>) One of the two basic inequality relations.

Examples: $8 > 5$, $28 > 25$, $80 > 50$.

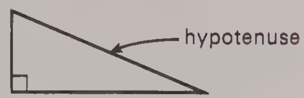
greatest common factor The largest, or greatest, number that is a factor of each of two numbers.

grouping principle (associative principle) When adding (or multiplying) three numbers, you can change the grouping and the sum (or product) is the same.

Examples: $2 + (8 + 6) = (2 + 8) + 6$
$3 \times (4 \times 2) = (3 \times 4) \times 2$

hexagon A six-sided polygon.

hypotenuse The side opposite the right angle in a right triangle.



improper fraction A fraction in which the numerator is greater than or equal to the denominator.

Examples: $\frac{8}{5}, \frac{9}{6}, \frac{12}{3}, \frac{7}{7}$

inequality (<, ≠, >) In arithmetic, a relation indicating that the two numbers are not the same.

inscribed circle A circle is said to be inscribed in a polygon if the circle lies within the polygon and each side of the polygon is tangent to the circle.

legs of a right triangle The two sides of a right triangle other than the hypotenuse.

length (1) A number indicating the measure of one line segment with respect to another line segment, called the unit. (2) Sometimes used to denote one dimension (usually the greater) of a rectangle.

less than (<) One of the two basic inequality relations.

Examples: $5 < 8$, $25 < 28$, $50 < 80$.

line A line is a set of points that "goes on and on" in both directions. There is only one line through any two points.

line segment See segment.

lower terms A first fraction is in lower terms than a second fraction if the first fraction is equivalent to the second fraction and if the denominator of the first fraction is less than the denominator of the second fraction.

Example: $\frac{6}{8}$ is in lower terms than $\frac{9}{12}$.

lowest terms A fraction is in lowest terms if the numerator and denominator of the fraction have no common factor greater than 1.

measure (1) A number indicating the relation between a given object and a suitable unit. (2) The process of finding the number described in (1).

midpoint A point that divides a line segment into two parts of the same size.

minus (—) Used to indicate the subtraction operation, as in $7 - 3 = 4$ (read, "7 minus 3 equals 4").

mixed numerals Symbols such as $2\frac{1}{2}$ and $3\frac{1}{4}$.

multiple A first number is a multiple of a second number if there is a whole number that multiplies by the second number to give the first number. Example: 24 is a multiple of 6 since $4 \times 6 = 24$.

multiplication An operation that combines a first number and a second number to give exactly one number. The two numbers are called factors, and the one number which is a result of combining the two numbers is called the product of the two numbers.

multiplication-addition principle (distributive principle) This principle is sometimes described in terms of "breaking apart" a number before multiplying.
Example: $6 \times (20 + 4) = (6 \times 20) + (6 \times 4)$

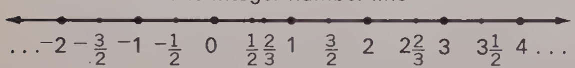
negative number If a number adds to a whole number to give 0, it is a negative number.

For example: $5 + {}^{-}\mathbf{5} = 0$
$19 + {}^{-}\mathbf{19} = 0$

number line A line with a subset of its points matched with a subset of the real numbers. We say that the rational number line has "holes" in it because some points are not matched with rational numbers. The real number line is said to be "complete" because each point is matched with some real number.

The number line

The integer number line



The rational number line

number pair Any pair of numbers. In this book, usually a pair of whole numbers.

numeral A symbol for a number.

numerator The number indicated by the numeral above the line in a fraction symbol.

odd number Any whole number that is not even.

one principle (for multiplication) Any number multiplied by 1 is that same number.

one-to-one correspondence A one-to-one correspondence exists between two sets when the elements of one can be matched with the elements of the other in such a way that each element of the first set is matched with exactly one element of the second set and each element of the second set is matched with exactly one element of the first set.

order principle (commutative principle) When adding (or multiplying) two numbers, the order of the addends (or factors) does not affect the sum (or product).

Examples: $4 + 5 = 5 + 4$
$2 \times 3 = 3 \times 2$

parallel lines Two lines which lie in the same plane and do not intersect.

parallelogram A quadrilateral with its opposite sides parallel.

parentheses A pair of curved symbols, ( ), used to indicate grouping or order of performing operations.

Examples: $(5 \times 4) - 2 = 18$
$5 \times (4 - 2) = 10$

pentagon A five-sided polygon.

perfect number A number that is half the sum of its factors.

Examples: 6, 28, and 496.

perimeter The sum of the lengths of the sides of a given polygon.

period In arithmetic, each set of three digits is called a period. These periods are called (right to left) units' period, thousands' period, millions' period, and so on.

Example:	**3 4 2**	**6 7 4**	**2 0 8**
	millions' period	thousands' period	units' period

place value A system used for writing numerals for numbers, using only a definite number of symbols or digits. In the numeral 3257 the 5 stands for 50; in the numeral 36 289 the 6 stands for 6000.

plus (+) Used to indicate the addition operation, as in $4 + 3 = 7$ (read, "4 plus 3 equals 7").

polygon A closed geometric figure made up of line segments.

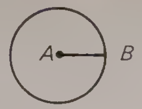
prime number A number greater than 1 whose only factors are itself and 1.

product The result of the multiplication operation. In $6 \times 7 = 42$, 42 is the product of 6 and 7.

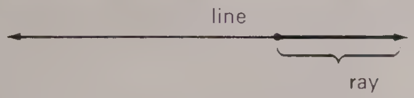
quadrilateral A four-sided polygon.

quotient The number (other than the remainder) that is the result of the division operation. It may be thought of as a factor in a multiplication equation.

radius (1) Any segment from the centre point to a point on the circle. (2) The distance from the centre point to any point on the circle.



ray The heavy part of the line shows a ray.



rectangle A quadrilateral that has four right angles.
regrouping A method of handling place value symbols in adding or subtracting numbers.
remainder:

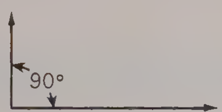
Example:

```
   6
7)47
  42
   5 ←—— remainder
```

repeated addition Finding the sum of a set of numbers, each of which is the same.

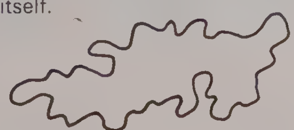
Example: $5 + 5 + 5 + 5$

repeated subtraction Starting with a number and repeatedly subtracting the same given number from each difference that is obtained.
rhombus A parallelogram with 4 sides of the same size.
right angle An angle that has the measure of 90 degrees.



a right angle

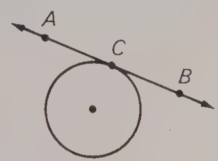
right triangle A triangle that has one right angle.
Roman numerals Numerals used by the Romans. Used primarily to record numbers rather than for computing. Examples: IV, IX, XIV.
segment Two points on a line and all the points on that line that are between the two points.
sequence A collection or set of numbers given in a specific order. Such numbers are commonly given according to some rule or pattern.
set A group or collection of objects.
simple closed curve Can be thought of as a loop of string that is on a flat surface and does not cross itself.



skip count To count by multiples of a given number. Example: Counting by fives — 0, 5, 10, 15, 20, . . .
solution The number or numbers which result from solving an equation or a given problem.
solve To find the number or numbers which, when substituted for the variable or placeholder, make a given equation true.
square A quadrilateral that has four right angles and four sides that are the same length.
subtraction An operation related to addition as illustrated:

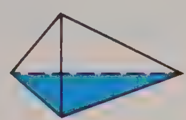
$$7 + 8 = 15 \begin{cases} \nearrow 15 - 8 = 7 \\ \searrow 15 - 7 = 8 \end{cases}$$

sum The result obtained by adding any set of numbers.
symmetric figure A figure that can be folded in half so the two halves match.
tangent A line is tangent to a circle if the two figures are in one plane and have exactly one point in common.

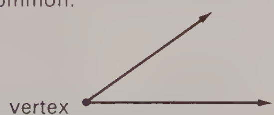


Line *AB* is tangent to the circle at point *C*.

times (×) Used to indicate the multiplication operation, as in $3 \times 4 = 12$ (read, "3 times 4 equals 12").
triangle A three-sided polygon.
triangular pyramid A 4-sided space figure that has triangular regions for all faces.



unit An amount or quantity adopted as a standard of measurement.
vertex The point that the two rays of an angle have in common.



volume The measure, obtained using an appropriate unit (usually a cube), of the interior region of a space figure.
whole number Any number in the set {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, · · · }.
zero principle (for addition) Any number added to zero is that same number.

Tables of Measures

LENGTH	
10 millimetres (mm) = 1 centimetre (cm)	1000 millimetres = 1 metre
10 centimetres = 1 decimetre (dm)	100 centimetres = 1 metre
10 decimetres = 1 metre (m)	10 decimetres = 1 metre
1000 metres = 1 kilometre (km)	1 / 1000 kilometres = 1 metre

TIME	
60 seconds (s) = 1 minute (min)	52 weeks = 1 year (yr)
60 minutes = 1 hour (h)	12 months (mo) = 1 year
24 hours = 1 day	365 days = 1 year
7 days = 1 week (wk)	366 days = 1 leap year

CAPACITY
10 millilitres (ml) = 1 centilitre (cl)
10 centilitres = 1 decilitre (dl)
10 decilitres = 1 litre (*l*)
1000 litres = 1 kilolitre (kl)

WEIGHT
1000 grams (g) = 1 kilogram (kg)
1000 kilograms = 1 tonne (t)

Index

A

B

C

D

E

DATE DUE SLIP

DUE EDUC JAN 14 '82
17.00
RETURN JAN 15 '82
DUE EDUC JAN 28 '82 9.00
1616
RETURN JAN 25 '82
DUE Educ FEB 4 1982
1759
0037
JAN 28 RETURN
DUE EDUC. MAR 19 '82
RETURN MAR 18 '82
DUE EDUC MAR 26 '82
RETURN MAR 24 '82
DUE EDUC JUL 19 '82
RETURN JUL 8 '82
DUE EDUC JUL 30 '82
RETURN JUL 19 '82
DUE EDUC OCT 13 '82
RETURN OCT 13 '82
DUE EDUC MAR 2 '83

RETURN FEB 23 '83
DUE EDUC APR 12 '84
APR 9 RETURN
MAY 13 '85
MAY 07 RETURN
DUE EDUC NOV 15 '89
NOV 07 RETURN
DUE EDUC DEC 19 '89
DEC 19 RETURN
DUE EDUC APR 20 '94
RETURN APR 19 '94

F255

QA 36-5 E34 1973 BK-4
EICHOLZ ROBERT E
INVESTIGATING SCHOOL
MATHEMATICS
39283343 CURR

000004355319

QA 36.5 E34 1973 bk.4
Eicholz, Robert E.
Investigating school
mathematics
0187413H CURR

1973
BK.4

CURRICULUM
EDUCATION LIBRARY

ISM

EICHOLZ • O'DAFFER • FLEENOR

B2602

ADDISON-WESLEY (CANADA) LIMITED